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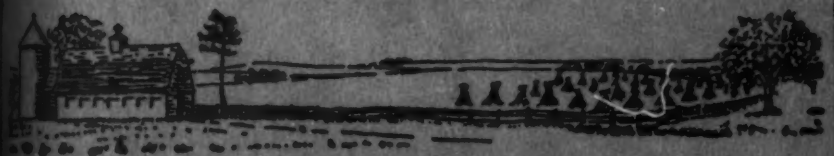

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The Farmer's Digest

Volume 15 August–September 1951 Number 3

Planning Your Pork Production

Condensed from Iowa Farm Science

Professor Raymond R. Beneke
Department of Agricultural Economics, Iowa State College

Hog raisers know that pork prices have their ups and downs. But they don't always give enough attention to the way in which these prices change. Hog prices usually follow a more or less definite pattern from year to year.

Prices normally hit one peak sometime in March. Then they drop off for a few months and rise to a second peak in late August or early September. Prices hit their seasonal low in December and January.

Price controls may change this to some extent. If demand for pork is stronger at some times of the year than the free market is permitted to show because of ceilings, seasonal price peaks will last longer. And price swings from the peaks to seasonal lows will narrow.

Just what does this seasonal price pattern mean to farmers? It means that many hog raisers may be able to get bigger profits by timing production to fit their own particular set-up. The main job is to see that pigs are farrowed at the right time. Your "right time" depends upon: how the rest of your livestock program is organized; the size of your hog enterprise; your labor supply and the money you have to invest in equipment. The length of time it takes you to produce a market-weight hog also is important.

You may find important advantages in the two-litter system. It helps you get fuller use from equipment. And it provides for more even use of labor throughout the year.

With the two-litter system, the cost of feed to maintain the breeding herd on most farms would be about a fourth less than under the one-litter system.

This advantage is partially offset by the breeding herd's greater gain in weight under the one-

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Ames, Iowa, June 1951

litter system. But you'd find some of the profit squeezed out of the hog business if you try to keep a sow for only one litter a year. That's why most pigs are farrowed by gilts under the one-litter system.

Most operaters want to keep risks at a minimum. The two-litter system helps do this.You're able to reach the market during two periods of the year instead of just one. If you hit a poor market with the spring litters, you have another chance to strike a good market when the fall pigs are sold.

If you produce early spring litters, you can take advantage of high September prices. But the pigs must be farrowed in February or early March on farms where hogs can be brought to market weight in 6 months.

Early spring pigs have another advantage. They can be gotten off to a better start than pigs farrowed in April or May when the danger from disease and parasite infection is at its height.

The same sows farrowing early spring litters can be bred to deliver a new crop of pigs in September. These fall pigs can then be pushed to selling weight in time to take advantage of high March prices.

This kind of system doesn't have to be too rigid. One way to make it flexible is to farrow fall litters with gilts and then hold over the gilts to farrow their second litter next spring. This way you don't have to farrow the spring litter early in order to get the sows rebred in time for fall litter. This system has one limitation. If spring pigs are farrowed late and fall pigs are early, there'd be a long period when two crops of pigs would be on hand at the same time.

The big question to ask about early spring farrowing is this: *Will the added returns take care of the added costs?* These costs will come mainly in the form of more and better housing and equipment, lamps and brooders to supply artificial heat and increased inputs of labor. If you already have this equipment plus adequate labor and *skill,* chances are you'll be ahead by farrowing early in the spring. Even though the early spring litters will take more labor, the peak demand during farrowing will come before spring work begins.

Early *fall* farrowing doesn't involve greater costs. In fact, you can often cheapen gains by making better use of pasture.

Many farmers find the one-litter system more desirable than the two-litter system. The one-litter system can still be adjusted to take advantage of seasonal price changes.

The farmer who farrows pigs in late February or early March can cash in on the early fall price peak if the pigs make fast gains.

And he's in good shape to raise a crop of fall pigs if prospects look good enough. If in midsummer the corn crop coming up looks short or if prospects are for a narrow hog-corn ratio, sows bred for fall pigs may be sold. Considered in this light, such a program is nothing more than a modified two-litter system.

Here's another form of the one-litter system. Hogs are farrowed in late May and early June and carried to heavier weight. Some farmers plan on bringing their hogs to the 275- to 300-pound weight range in 8 to 8½ months. Thus hogs farrowed in late May or early June can be sold in February when prices have begun to recover from the winter low. This system often works out well on farms where production is on a large scale. Labor and equipment needed for early spring farrowing places too low a limit on numbers where the operator depends on a large volume of output rather than a high return per unit of pork for his profit.

Advantages for early farrowing largely hinge upon getting hogs to market before the severe seasonal price decline in the fall. Many hog producers consistently take a period of more than 6 or 7 months to bring hogs to a marketing weight —either because they deliberately practice a limited grain feeding program or more likely because they're not successful in planning the combination of practices needed for rapid gain.

Producers who consistently can't bring early farrowed pigs to market weight in 6 or 7 months should give serious thought to sticking with the one-litter system and later farrowings. Production costs are lower then, and the hogs could be marketed after prices have begun to recover from their winter low. By farrowing early the producers who can't market hogs at 230 pounds in 6½ to 7 months incur the higher costs of early farrowing but forego the advantage of the higher late summer and early fall prices.

Your next question is when and at what weight should you market your hogs? There's no one most profitable marketing weight for hogs, instead they vary widely from month to month and from year to year.

Our studies of hog producers in the Iowa Farm Business Associations indicate that generally it pays to sell hogs within a weight range of 200 to 230 pounds in late summer and early fall, and at considerably heavier weights later in the year.

But there have been many years when profits could be boosted by selling hogs at lighter or heavier weights than the typical most profitable marketing weight for a given time of year. In deciding how heavy to feed your hogs, the general rule to follow is this: Con-

tinue adding weight as long as the increase in value exceeds the cost of putting on the extra weight. Doing this isn't too simple. There are a lot of angles to consider.

For example, in 1949 the good to choice hog weighing 180 pounds on September 1 was worth $36. This hog weighing an additional 20 pounds would have been worth $41 on September 13. The increase in value would have been $5. The cost of putting on the extra 20 pounds was only $2.50. So, here extension of the feeding period would have paid off well.

But let's go one step further and assume that the hog was carried on to September 25 and weighed 220 pounds. We find the hog showed a net loss in value—from $41 at 200 pounds to slightly less at 220 pounds. At the same time, the producer's cost went up an additional $2.50. The hog raiser would have been better off to have sold on September 13 at 200 pounds.

Of course, this is hindsight; what the farmer needs is foresight. But past experience gives us these guideposts to follow:

If hogs reach 180 pounds by September 1, the fall drop in prices generally limits the most profitable marketing weight to 220 pounds or less. The same commonly holds true for later hogs —those reaching 180 pounds by October 1— through there are some exceptions.

The seasonal price pattern becomes less important in the case of hogs reaching 180 pounds in November and December. Ordinarily the seasonal price decline has spent itself, and the market begins to work upward. Hogs can often be profitably fed to much heavier weights. Still, the added costs of putting on more weight eventually build up to the point where the value added doesn't outweigh the added cost.

Remember that a price change won't simply affect the additional pounds of pork you put on. It will also raise or lower the price you receive for all the pounds you put on earlier. Thus a relatively small change in price can mean a big difference in the profitability of the operation. Consequently it's important to consider whether there are likely to be any general changes in pork price levels during any period of extended feeding.

At what rate can you convert feed into pork? Feed is the biggest cost in carrying hogs to heavier weights. The heavier a hog gets, the more feed it takes to put on additional pounds.

For example, it takes 17 percent more feed to put 25 pounds on hogs in the 275- to 300-pound range than hogs in the 200- to 225-pound range.

Farmers who get a relatively large amount of gain for the feed they put into hogs can feed to

heavier rates more profitably than can less efficient producers.

Another thing to consider is the relationship between feed costs and pork prices.

The higher the prices of pork in relation to feed costs, the heavier will be the most profitable marketing weight. This is because the cost of putting on extra weight doesn't catch up with the added value so quickly as it would under a narrower relationship.

Don't forget that packers commonly pay different prices for hogs in different weight ranges. It's hard to estimate these price differentials because they change from season to season and year to year.

But again, past experience has set up a few guideposts for us: Butcher hogs below 220 pounds typically sell for less than hogs weighing 220 to 240 pounds during late summer and early fall—but for slightly more during the winter.

As hogs get past the 220- to 240-pound range, the price usually starts dropping. This discount normally increases as hogs get heavier.

Table 1 may help you make short-run decisions on how long to carry your hogs. It can give you a good idea of what feed and pork prices should be to make it profitable to hold your hogs for heavier weights.

TABLE 1
Selling Prices Needed to Cover the Variable Cost of Carrying Hogs One Additional Month

If corn is valued at	With the current price of hogs at					
	$16	$18	$20	$22	$24	$26
	For hogs weighing 200 pounds now					
$1.25	15.18	16.79	18.39	20.00	21.61	23.21
1.50	15.54	17.14	18.75	20.36	21.96	23.57
1.75	15.97	17.58	19.18	20.79	22.39	24.00
2.00	16.41	18.01	19.62	21.23	22.83	24.44
	For hogs weighing 225 pounds now					
1.25	15.33	16.97	18.61	20.26	21.90	23.54
1.50	15.66	17.31	18.95	20.59	22.23	23.87
1.75	16.08	17.72	19.36	21.00	22.64	24.29
2.00	16.49	18.13	19.77	21.41	23.05	24.70
	For hogs weighing 250 pounds now					
1.25	15.55	17.23	18.90	20.58	22.26	23.94
1.50	15.87	17.55	19.23	20.91	22.59	24.26
1.75	16.28	17.95	19.63	21.31	22.99	24.66
2.00	16.68	18.36	20.03	21.71	23.39	25.07
	For hogs weighing 275 pounds now					
1.25	15.58	17.28	18.99	20.70	22.41	24.12
1.50	15.87	17.58	19.28	20.99	22.70	24.41
1.75	16.23	17.94	19.65	21.35	23.06	24.77
2.00	16.59	18.30	20.01	21.72	23.42	25.13

Calculations in this table based on feeding performance of medium-efficient hog producers in the Iowa Farm Business Associations. Costs include corn and other feed inputs: labor expenses were not estimated. Thus if a return is to be made on added labor for an extended feeding period, prices must be somewhat higher than those indicated in the table.

But the estimates on what future prices will be are up to the individual hog producer. These can't always be too accurate, nor always hit the mark. The alert hog producer should increase his percentage of "hits" by study and by experience.

Good Udders Are Born

Condensed from Holstein-Friesian World

E. S. Harrison
Cornell University

THE practice of offering high production as an alibi for a broken-down pendulous udder has been followed too long and with too much success. The completion of a good record should not entitle a cow to membership in the pendulous uddered club that affords her the equivalent to congressional immunity against criticism. The owner that offers this alibi is simply kidding himself and the breeder who accepts it is little short of a sucker.

Inheritance and inheritance alone determines the conformation of an udder. The udder that possesses correct conformation is built to wear and withstand the strain of high production. If an udder is poorly attached it will become pendulous regardless of the productive level. There are factors, however, that contribute to or hasten udder breakdown when the inherited design is wrong, but inheritance remains the direct cause.

Most important among these contributing factors are: (1) Overfeeding of concentrated feed to heifers and especially heifers below the breeding age. When heifers are permitted to become excessively fat a certain amount of fatty tissue is laid down in the udder that never entirely disappears. If there is an inherited tendency for a large, meaty, poorly, attached udder, overconditioning greatly exaggerates the fault.

(2) Feeding large quantities of heavy grain during the dry period that in turn produces excessive congestion of the udder. This practice represents poor herd management even when working with cows possessing correct udder conformation and can be disastrous with cows with an inherited tendency for an over-size, weakly attached udder. Extensive congestion of the udder impairs

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circulation and with poor circulation the waste and toxic products of metabolism are not promptly removed. These waste materials tend to poison the tissue and destroy its ability to fight off the invasion of disease producing bacteria. In the case of infection the condition of the udder makes medication extremely difficult. In additon there is an accumulation of fluid in the tissue that spells excessive weight and greater strain upon the udder attachments. We have learned that by feeding grain a little more generously during the latter part of the lactation period the cows start the dry period in good flesh and it is not necessary to feed a lot of grain to condition them for the next lactation. This practice reduces udder congestion to a minimum and makes it possible to get the cow on full feed within a few days after calving. I should add, this liberal feeding during the last few months of the lactation slows the expected normal decline in production while it conditions the cow for the next working period. Thus by feeding some of the grain in the last months of the lactation that is normally fed during the dry period, you get more milk and less udder damage with the same poundage of grain.

(3) Inadequate stall space and especially short platforms. The damage resulting from this hazard is further increased by insufficient bedding. This hazard can and should be eliminated. It is simply a question of doing something about it.

(4) Disease can ruin an udder regardless of conformation, but is more common and more serious in the large pendulous, meaty udder. A large meaty udder is usually slow to milk out and difficult to milk dry. Failure to milk an udder dry ranks high among the contributing causes of mastitis. The pendulous udder seldom escapes injury for an entire lactation. Injury not only takes a heavy toll itself but is infection's Number One assistant.

(5) The higher the productive level of a cow, the greater will be the strain on the udder attachments. Therefore, a poorly attached udder will become pendulous in fewer lactations on a high producing cow than on a low producer. This fact has misled many dairymen and they have come to associate a pendulous udder with high production. The pendulous udder is not proof of high production and regardless of the productive level it must be considered a major conformation defect. An udder correct in the attachment and free from excessive meaty tissue will not break down or become pendulous even under the strain of record breaking performance. Production is no alibi for a pendulous udder.

The importance of the udder is

clearly emphasized by the breed score card. The assignment of 30 points to the udder alone out of a total of 100 simply means that if the udder is undesirable, the cow is undesirable.

When considering a cow for purchase I first examine the udder. Here are some of the things I am looking for. The udder should be of just moderate size and possess quality. An udder that possesses quality is completely collapsed when milked out. I hate an udder that is nearly as large after milking as it was before being milked. From experience I know these udders milk out slowly and that usually the productive capacity will be just average to low. Two and three year olds are immature and therefore their udders should be immature. Beware of heifers whose udders are as large as should be found on an aged cow. They will not last.

The best available information tells us that the average productive life of a cow in New York state is only four lactations. This simply means that the average cow has one lactation in mature form and three lactations of immature performance. Defects in conformation and especially the udder are largely responsible for this short productive life. If by selection and good herd management we could double the length of the productive life of our cows we would change the entire economic picture of dairying. Replacement costs would be cut in half. With fewer replacements needed, it would be possible to practice greater selection. Doubling the productive life would also double the potential number of offspring from a group of cows. Thus, in a few generations, a large part of any herd would be descendants from the top cow families. There would be five lactations of mature performance against an average of only one at the present time.

There are greater possibilities of making this a reality than one is likely to realize upon first thought. By actual count there are 19 cows in our herd from 9 to 15 years of age. There are a number of others from 7 to 8 years old that show every promise of many more years of efficient production. We have come to really appreciate these old cows. They have with few exceptions continued to show an increase in production, lactation after lactation, and some of them do not appear yet to even have reached their top.

The importance of longevity and continued year after year high production cannot be overemphasized. No one can deny the fact that a cow must possess correct dairy type (not necessarily all the smoothness required to win in the show ring) to be able to maintain high and efficient production to ten years and older.

Where then does the present method of proving bulls fit into the picture? Any proving that ignores type is unsound, even if these provings successfully named the bulls that are capable of increasing production. Time and more complete information have shown that many of these abortive provings are wrong. In the meantime, a lot of dairymen have been misled. A number of bulls have been labeled desirable that would have been recommended for the butcher if these office experts had taken a good look at the individuality of the daughters. What is even more damaging, these abortive provings frequently result in a potentially good bull being sent to the butcher. Just this very day a well known breeder said the greatest bull they had ever used had a minus proving of 100 lbs. fat on the basis of his first group of two year old daughters. This is not an unusual isolated incident. There are hundreds, yes thousands of similar cases. Therefore, I personally feel that any individual or group of individuals that place their stamp of approval upon a bull without knowing all the facts and making a careful study of the conformation of his daughters are retarding breed advancement. These are strong words, but the facts justify them. If I am wrong, how then can we justify our local Black and White shows, our county shows, our state and regional shows, herd classification, judging instruction to 4-H club boys and girls, to agricultural high school students and to college students?

Kentucky-31 Fescue For Grazing

Condensed from Better Crops With Plant Food

Barrington King
Soil Conservation Service

"DON'T put this in your story because no one will believe it," Col. Carl Jones said, "but we pastured 400 head of cattle on this 125-acre field of fescue all last winter."

The car in which we were riding rolled across the firm, green carpet of fescue and came to a stop in the middle of the field. We got out and examined the sod and, frankly, it was hard to believe.

But we had seen enough that day to be in a believing mood. Six hundred and fifty head of sleek, white-face cattle were graz-

Reprinted by permission from Better Crops With Plant Food.
Washington, D. C., January 1951

ing on various parts of the 750 acres of Kentucky-31 fescue on the G. W. Jones and Sons farm. And 500 acres of the fescue was first-year growth. Nearly 200 acres had been planted in December on land that had been in cotton. The fescue came up to a perfect stand, but they wouldn't recommend planting it that late, ordinarily.

The 3,000-acre farm, near Huntsville, Ala., operated by Col. Jones and his brother, Brig. Gen. Edwin Jones, is using the fescue in a dual program, for grazing and seed production. They planted their first fescue in the fall of 1947, after having seen one of the five-acre observational plantings made from seed furnished by Soil Conservation Service nurseries to the Northeast Alabama Soil Conservation District.

The Jones brothers were so impressed by the new grass that they made a special trip to Kentucky, where they visited "every field of fescue in the State." They got their foundation stock from Pembroke, Ky., where the original planting of the University of Kentucky was made with seed from the B. F. Suiter farm. Two years later, in 1949, the Jones farm produced more than 90 per cent of the certified Kentucky-31 fescue seed grown in Alabama.

"Of course," Col. Jones went on to explain after we had examined the sod where the 400 head had grazed during the winter, "we don't advocate such heavy grazing under ordinary conditions. The fescue in this field was over knee-high when we turned the cows on it on November 13. they stayed right here until March 13. And during that period we had more than 30 inches of rain. But you can see for yourself, the ground's not marked. We fed them some meal and hulls," he added, "but only during extremely cold weather and when the grass had been hit by a heavy frost. We haven't a cow on this farm that has ever been in a barn."

We had seen the herd of 400 brood cows earlier that day grazing on an 80-acre field of fescue that had been planted November 19, 1949, on a two-year-old stand of sericea. They had been there since they came off the winter pasture three weeks before. The weather had been cold for the past few weeks and the sericea had not yet put out new growth, but the fescue was furnishing plenty of green grazing.

The fescue was planted on the sericea at the rate of 20 pounds to the acre with the drill on top of the ground. The land had been disked twice, with most of the angle out of the disk.

In another field of 75 acres, 150 young heifers that had been cut out for brood cows were grazing fescue planted last October in

what had been an old pasture that had grown up in weeds. Another herd could be seen grazing in an adjoining field and a low-lying area nearby was being cleared for planting more land to fescue.

At seeding time, Col. Jones told us, they drill in 300 pounds of 6-8-8 with the seed. About March 1 they add an application of 100 pounds of ammonium nitrate per acre. He said they planned to add an equal amount of ammonium nitrate in the fall if they expected to graze the fescue, and would add potash and phosphate as the soils needed it.

The Jones brothers use 2,4-D to kill wild onions and other weeds to keep impurities out of the fescue seed. This also kills the clover, but Col. Jones pointed out that they could add clover any time, in fact, it is coming back naturally in some of the fields.

Pest Control By Bacteria

Condensed from California Agriculture

Professor Edward A. Steinhaus
University of California

A SPORE-FORMING bacterium —*Bacillus thuringiensis* Berliner—successfully reduced populations of the alfalfa caterpillar to below the economic level in field tests near Dos Palos, California.

The bacillus is produced easily in large quantity, stored in powder form, and applied to infested fields by any sprayer used for the application of insecticides.

The bacterium acts relatively fast, killing the pest within two days, and leaves the alfalfa clean.

The spore material was grown in nutrient agar, washed off, filtered, poured into flat enameled pans, and allowed to dry. The dry, brittle deposit of spores was scraped from the pans, and ground into fine powder. Tests indicate that the dried spores retain their viability and virulence, when stored properly, for at least one year, and probably much longer.

The concentrated spore powder was placed in suspension in an ordinary five-gallon back-pack hand sprayer, and diluted with water to make the final spray so-

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University of California College of Agriculture,
Berkeley, California, June 1951

lution. Aircraft spraying and the use of spore dusts instead of sprays also seem feasible.

Two series of test plots were set up, each in a separate alfalfa field. The first series consisted of six test plots and three control plots, and ran from August 1 to August 4, 1950. The second series consisted of three test plots and three control plots, and ran from August 29 through September 1, 1950.

The approximate total concentration of spores—or clumps of spores—applied to each plot varied from six to 13 billion.

The age of the spores varied from one to 12 months.

Within 24 to 48 hours following the spray applications, microscopic and cultural examinations of the dead and dying caterpillars showed symptoms of sluggishness, diarrhea, discoloration, and flaccidity typical of most bacterial infections. After death the bodies of the pest darkened, softened, and developed a putrefying odor.

In at least seven of the nine test plots the caterpillar population was brought below an economic level—about 20 larvae per two sweeps of net—while in each of the untreated check plots the population remained at a destructive level—from 61 to 90 larvae per two sweeps. In the two remaining test plots the count was brought down to just slightly above 20, and would very probably have been reduced further in another day or two. The plots were cut for hay before the tests could be run to their desired completion.

Control of the alfalfa caterpillar by *Bacillus thuringiensis* was compared with that by the polyhedrosis virus, another promising biological control agent. The virus method appears to be at least slightly more thorough in its effectiveness, but there are at least two possible advantages of the bacillus over the virus: the bacterium is more quickly effective, and the infection leaves the integument of the insect intact.

Because of its longer incubation period the virus usually does not begin effectively to reduce the alfalfa caterpillar population until five or six days after application. In the case of the bacillus, marked reduction in the number of insects occurred by the second day.

When the alfalfa caterpillar is killed by the virus, the integument usually disintegrates and breaks open, permitting the liquefied body contents to run out over the host plant. When this occurs on a large scale, the palatability of the hay for cattle is sometimes adversely affected. When the bacillus was used, the integument of the insect ordinarily remained intact. Most of the dead larvae dropped to the ground without smearing the alfalfa plant.

A combination of the bacillus and the virus might constitute a more highly efficient means of control of the alfalfa caterpillar than use of either agent alone.

Such a bivalent product would be simple to make up in the field prior to application. It also could be prepared in advance if the virus material as well as the spore material were in the form of a powder or dust.

Following the application of the combined materials one could expect to have an initial rapid drop—within 48 hours—in the caterpillar population as a result of infection by the bacillus, followed three or four days later by a further reduction in the remaining population as a result of the virus infection. Whether such desirable results would actually occur can only be ascertained by further experimentation.

Additional tests are needed to come to definite conclusions about the efficacy and practicability of the method using bacterial control of the alfalfa caterpillar. The fact that the bacillus is pathogenic for some insects under certain conditions, and that it retains its virulence when cultivated repeatedly on artificial media or when stored in a dried condition makes it an inviting organism with which to work, especially since it is a potential control agent not only against the alfalfa caterpillar but against certain other insects as well.

Dairydom's Madam Xs

Condensed from The Farmer

William H. Kircher

THE Madam Xs of this story are cows.

They have such unexciting names as X68, X62, X57. But even though they are just cows with unexciting names they have caused a great deal of heated controversy because they are crossbreds. They are mixtures of two, three and even four dairy breeds, so in the eyes of some purebred breeders they are mongrels. In the eyes of other breeders they are notable animals, proving, it is contended, that hybridizing works much the same when applied to dairy cows as when applied to corn.

This crossbreeding of dairy animals was started in 1939 by M. H. Fohrman, head of dairy cattle breeding in the USDA's Bureau of Dairy Industry.

By 1946 there were records on

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32 two-breed crossbred heifers and 5 three-breed crossbreds. Those records indicated that the crossbreds produced about 20% more milk and butterfat than careful calculations based on the records of their sires and dams showed they would produce. In an announcement of results released in May of 1946, Mr. Fohrman wrote this guarded sentence: "This (the 20% increase) may be the result of hybrid vigor." Using the word "may" instead of "is" in that sentence did not delay the start of arguments.

The purebred versus crossbred controversy got under way immediately, continued heatedly for a time, then died down. Lately there has been a revival of interest in Fohrman's crossbreeding investigations, especially among dairymen who see in the records of these crossbreds an opportunity to make the best use of some of the great sires in artificial breeding association studs.

Here are some of the questions which now arise:

Have the crossbreds fulfilled their early promise?

How well are they doing in farm herds, handled under farm conditions?

Has crossbreeding proved itself to the extent that it is likely to become as common in dairy cattle breeding as in commercial hog breeding?

We went to Beltsville, Md., to ask Mr. Fohrman these questions. We asked them of Dr. L. M. Winters of the University of Minnesota, best known for his development of the Minnesota No. 1 and Minnesota No. 2 breeds of hogs. We put the same questions to Robert E. Hodgson, superintendent of the Waseca (Minn.) Experiment Station, and a discerning observer of these crossbreeding studies. We also got the opinion of Wallace Miller, manager of the Minnesota Valley Breeders Association, New Prague, Minn. Measured by the number of cows bred last year (114,700 head), the association which Mr. Miller manages is the fourth largest in the United States.

To answer the question of whether crossbreds are doing well in farm herds, Mr. Fohrman pulled from his desk last year's report of the Carroll County, Md. No. 1 Dairy Herd Improvement Association. Last year there were 682 cows on test in that association. Four of them produced more than 600 pounds of butterfat. Every one of those four were three-breed crossbreds — Red Dane, Jersey and Holstein. All had been milked twice a day. All records were for 305 days. X68 had produced 684.9 pounds of butterfat; X62, 670.5 pounds; X57, 664.8 pounds, and X82, 632 pounds. Of seven cows which had produced less than 600 pounds,

but more than 550, five were crossbreds, one was a registered Guernsey and one a registered Holstein. In the list of 13 producing less than 550 pounds, but more than 500, there were seven crossbreds.

All the crossbred cows listed in the report are in the herd of Frank Parrish, formerly a breeder of Ayrshires. He is gradually dropping the purebred Ayrshires and is breeding his Red Dane-Jersey-Holstein cows to a fine Ayrshire bull.

Answering the question of whether the crossbreds are fulfilling their early promise, Mr. Fohrman opened the published report of the Bureau of Dairy Industry for last year and pointed out these two paragraphs:

"Production records are now available for 54 two-breed cows and 48 three-breed cows, including a few four-breed cows and second-cycle three-breed cows. All cows were milked three times a day, for 365 days, and were bred about 4½ months after calving. No culling was practiced and all cows were tested for production, usually as first-calf heifers.

"The 54 two-breed cows comprising the first cross produced on the average 13,006 pounds of milk and 585 pounds of butterfat at the average age of 2 years, 2 months. This was an average increase over their straight-bred dams of 2,868 pounds of milk and 143 pounds of butterfat. The average age of the dams was 2 years, 4 months.

"The 48 three-and-four-breed cows averaged 13,069 pounds of milk and 585 pounds of butterfat at 2 years, 1 month of age, which was about the same as the two-breed dams."

Commenting on the records of the crossbreds and recounting the history of the experiment, Dr. Winters said:

"The first figures taken at face value indicated that production increase as a result of crossing was somewhere between 25 and 30%. Further study convinces geneticists that these figures should be scaled down, perhaps to about 15%. But," he emphasized, "15% is a substantial increase. It proves that there is something substantial about hybrid vigor.

"It is not surprising that this hybrid vigor should show up as a result of the crossing of dairy cattle. It simply proves that they follow the biological pattern of other animals."

Of the cows, Dr. Winters, who has seen nearly all of them recently, declared: "One cannot see those cattle and not be impressed by them, or study their records, and not be impressed."

They are an impressive lot of cattle. Looking at them in their stanchions you see the color of the Red Dane in those which

have Red Dane in their breeding. Near the door as we entered one barn was a fine, big, red cow. Over her head was a placard which showed her breeding and her production. She had produced 656 pounds of butterfat in 333 days. Her dam was a Holstein-Jersey crossbred, her sire a Red Dane. Another red cow stood nearby. The placard over her head showed she was sired by a Holstein-Red Dane bull and was from a Red Dane - Holstein - Guernsey dam.

Will these cows with their impressive records persuade the dairyman who is more concerned about production than about having a purebred herd to do crossbreeding? Bob Hodgson believes that eventually it will. "I believe," he said, "that within 25 years the majority of commercial dairy herds will be crossbreds.

"There will continue to be criticism of crossbreeding. It will come from men honestly convinced that crossbreeding will ruin our dairy breeds. We had that criticism in the years when we were getting started with hybrid corn. I recall one of my good friends, a producer of fine Silver King seed corn coming to a corn show with ten beautiful ears of his seed corn, and telling us that we would never have a hybrid as good. There was another who specialized in Calico dent. He felt the same way. Eventually both turned to the production of hybrid seed. And I talked with a man at our county fair who insisted that the swine industry was being ruined by crossbreeding, that crossbreeding is on the decline. Well, if there is a decline, I haven't seen evidence of it."

But Bob Hodgson warns, as do Dr. Winters and others, that crossbreeding, if it is to be highly beneficial, must not be haphazard. They also point out that in the crossbreeding of dairy cattle, as in other hybridizing, gain isn't piled on top of gain simply by adding breed after breed to the cross.

Just what cross would you make, Dr. Winters was asked, if you had some grade Holsteins? "I would cross them with a good Jersey bull, and continue using a Jersey until the entire herd was crossbred. Then, if from my artificial insemination association I could get semen from an outstanding bull of a third breed, I'd cross my Holstein-Jersey crossbreds with that bull."

Of what might be expected of the first cross, Dr. Winters gave this example. If you had a cow producing 300 pounds of butterfat per year and a bull of the same breed which would raise the production of the daughter to 360 pounds, that same bull bred to a 300-pound cow of another breed would probably increase the production to 410 pounds. That 50-

pound difference between 360 and 410 results from hybrid vigor.

But when you have gotten the offspring to the 410-pound level, you have made the biggest single jump you can get from hybridizing. Introduction of a third breed will help hold it there. Inseminating with semen from better bulls of either of the breeds in the cross or of a third breed, will bring an increase.

Is some of the crossbreeding being done in Upper Midwest dairy herds now? Wallace Miller asked that question of some of the members of the Minnesota Valley Breeders Association. The answer was "Yes." Have results been satisfactory? Again, yes.

Lightning

The chance of being killed by lightning is one in 365,000.

There are 44,000 lightning storms every day, and 100 lightning flashes every second, according to estimate.

About 400 persons are killed annually by lightning in the United States, and 1,500 are injured.

Lightning is the main cause of fires in rural areas and most of the deaths and injuries from lightning occur in the country.

Buildings in the large cities offer better protection from lightning strikes as they usually contain water and heating pipes that act as lightning rods to carry current to the ground.

Lightning is very hot—some strokes generating a temperature of 27,000 degrees Fahrenheit.

Lightning can and does strike twice or more, and sometimes in the same place.

One of the safest places in a lightning storm is in your car if it is an all-steel closed model, for, if struck, the steel body conducts the current away from occupants.

A person struck by lightning, if not instantly killed, may be saved by prompt use of artificial respiration.

Rules for safety in a lightning storm include: get indoors, keep away from beaches, fields and open spaces, and don't go in swimming.

Persons should keep away from exposed hilltops, high masts and isolated tall trees, wire fences and other wires.

If caught away from shelter, out in the open, a person should take refuge in a ditch or under an overhanging cliff or lie on the ground.

Thunder makes the noise—lightning does the damage.

Your Health
—Medical Society, State of Penna.

Trash Mulch Seeding

Condensed from Ohio Farm & Home Research

H. L. Borst
U. S. Soil Conservation Service

THE trash mulch method of reclaiming idle land or rejuvenating unproductive land with legumes and grasses fills a definite need in the hill sections of Ohio. This fact has been shown by practical field trials conducted in 16 counties of eastern and southern Ohio from 1944 to 1948, inclusive. The trash mulch method of preparation, means working up the seedbed with some implement that leaves the plant residues in and on the surface rather than burying them, as ordinary plowing does. The trials were located on private farms and were a joint project in which farmers, the Extension Service, the Ohio Agricultural Experiment Station and Soil Conservation Service cooperated. In all there were 90 trials on nineteen soil types. Records of lime and fertilizer applications, method of preparation, time of seeding, use, production, etc., were obtained from the farmer-cooperators. Although the trash mulch method of seeding is particularly desirable on slopes too steep to plow, a fairly wide range of slopes were covered by the trials and some seedings were made on level land. Nearly one-half of the seedings were made on idle land. Some such areas had not been cropped for 20 years, others from 5 to 15 years. An equal number of trial seedings were located on what was called pasture land. In many cases it was equally as unproductive as the idle areas. Some trials were made on old meadows. The trials were inspected each year and were rated as excellent, good, fair, or poor, and failures.

Of the 90 trials, 81 were classed as successful at the end of the first season. Their ratings were 19 excellent, 27 good, 22 fair, 13 poor and 9 failures. At the end of the second season some 3 or 4 of those previously called failures were rated as successful seedings, and the farmers were repaid for their efforts. Yields of 2 to 3 tons per acre of high quality legume-grass hay were reported from the trial areas used for hay and many days of summer pasture from others. The results of these field trials indicated that

(1.) The trash mulch method

Reprinted by permission from Ohio Farm & Home Research, Wooster, Ohio

is a good erosion control practice. It is especially valuable in establishing legumes and grasses on idle or unproductive sloping fields where erosion would be serious if they were plowed and prepared in the usual way.

(2.) That with adequate soil amendments, eroded and unproductive hill lands of Ohio will produce profitable crops of grasses and legumes including alfalfa.

(3.) Sowing grasses and legumes, including alfalfa, is a logical first step in restoring the productivity of eroded and unproductive hill land.

Some of the things learned in the experimental work were emphasized by the trials. Failures or poor stands were the result of (1) inadequate preparation, (2) lack of lime or fertilizer, and (3) improper seeding methods. The chief cause was inadequate preparation.

This method of seeding is advantageous on sloping land for several reasons. Foremost is its erosion control value. A trashy surface resists erosion to a remarkable degree because the soil surface is not sealed by the force of falling raindrops. The porous soil takes in much of the rain and little if any runoff and resulting erosion occurs. The trash in and on the soil surface also acts as a mechanical barrier to erosion. Lime, fertilizer and even seed may be taken with the soil washed from plowed hillsides by heavy rains. Infiltration of most of the rainfall makes for a good supply of moisture for the seeding. The trashy surface also reduces evaporation and in this way improves favorable soil moisture conditions. Also, most unproductive soils are low in organic matter. When plant trash is left in or on the surface and is mixed with the fertilizer applied it gives a shallow layer of "made topsoil" which is favorable to the growth of the seedlings of grasses and legumes.

The following recommendations are based on the field trials and accompanying experimental work.

1. On idle or unproductive hill land where there is a grass vegetation that is worthless as a feed.

2. On other hill grass land now in a state of low production where it is desired to improve grass and legume production as quickly as possible.

3. On similar areas where it is desired to change the species of vegetation.

In the first category are virtually idle (sometimes abandoned) areas covered with broomsedge, poverty grass, weeds, briars and even thorn bushes. Usually such land is too low in fertility for general cropping.

In the second category are areas now called pasture land where the desirable grass species are thin and lacking in vigor. If

such areas have a fair percentage of bluegrass, they may be much improved with the least cost by adequate treatment with lime and fertilizer. If, however, there is urgent need for an increase in production and quality from the field in the shortest possible time, trashmulching comes into the picture because in a year's time (sometimes less) a trashmulched area will be in nearly full production.

The third situation may be somewhat like the second but where a different type of forage is desired. Many hill farms need hay in addition to that produced on the rotation cropland. Also there is need for hay-type summer pasture. This need is often met by dual purpose meadows. Occasionally a hill farm has more permanent pasture than can be used to best advantage. Converting a part of this to a dual-purpose meadow is advantageous.

In general, spring seedings are recommended. To make a spring seeding it is best to apply the lime and start working the ground the previous fall. As early as possible in the spring complete the preparation and make the seeding. Getting some of the work out of the way the previous fall enables one to sow early in the spring and earliness is desirable. The soil should be dry enough so that it will work up into a good seedbed. Although early seeding is recommended many successful seedings have been made well into May. In general the later the seeding the more the risk.

Many successful summer seedings have also been made. The trash mulch method overcomes one of the chief disadvantages to conventional summer seedings, i.e., danger of erosion damage. Soil moisture is more uncertain during the summer and it is this fact that favors spring seeding. A summer seeding should be made before August 15 or August 25 at the latest.

The first step is the application of lime. The amount applied is more important than the method of application. Have the soil tested and apply enough lime to bring the soil reaction up to pH 6.5 or 7, depending on the plants to be sown. If Ladino clover or Birdsfoot trefoil is to be sown a pH of 6.5 is sufficient. If alfalfa is sown the reaction should be pH 7. As previously pointed out, it is desirable to apply the lime during the fall before the seeding is to be made.

Work up the old vegetation with a heavy disk, field cultivator or similar tool, or a rotary tiller of some sort if available. If an ordinary farm disk is used, it should be weighted with several hundred pounds of stone, sand or other heavy material, particularly if old vegetation is dense. Ordinary farm disks, heavy disks, disk til-

lers or one-way disks, cutaway disks, field cultivators, rototillers and even horse-drawn corn cultivators were used in the trials. A heavy type disk, either offset or straight, or the one-way disk tiller are the most rapid implements. They require considerable power and may cut too deeply. The one-way is a bit difficult to handle on steep slopes. On the whole, the field cultivator type of implement does the job most satisfactorily. If the old sod is heavy, this implement may leave the field rough so that disking is needed to finish the seedbed.

The amount of working will depend much on the amount and kind of vegetation on the field. It must be remembered that the old vegetation must be killed in so far as possible so that it will not compete with the new seeding. That means that it must be cut loose and well chopped up. In the second place, a seedbed must be made. Although trash mulching with a good implement takes no more time than plowing and fitting, many become discouraged before they have a good seedbed because they have to go over the field more times than is required for conventional working. A general opinion prevails that about all that is necessary is to loosen up the old sod enough to expose some soil for the seed to fall into. Although some excellent seedings have resulted from this sort of preparation, it is really inadequate. The preparation should be sufficient to make a fairly smooth, but not necessarily a finely worked seedbed. In fields where there is a fair sod of cultivated grasses, either bluegrass or hay grasses from a previous seeding, working up with a disk or cultivator-type implement may be difficult. It may also be impossible to kill out the old grasses. On such an area shallow plowing is recommended. A word of caution is needed, however, for many are inclined to think that they are not plowing right unless they cut a good, deep furrow. A furrow slice three inches or less, no more, and disked up thoroughly makes a good trash mulch seedbed. Cultipacking before seeding is a good practice but not as essential as cultipacking after seeding.

Of the various methods of seeding tried, broadcasting after, or at the same time the fertilizer is drilled is recommended. Arranging the grass spouts so that the seed falls back of the disks is a method of broadcasting.

Drilling usually puts the seed too deep. Band seeding has been tried but is not recommended as this method requires a fine and smooth seedbed.

Although many successful seedings have been made with an application of 400 pounds of fertilizer, heavier applications have paid off. One cooperator acci-

dentally put in 1,000 pounds of 0-12-12 and had an excellent meadow. An initial application of from 400 to 600 pounds per acre of 0-20-10 or equivalent is recommended. Although some excellent seedings have been made using a complete fertilizer, and there are theoretical arguments in its favor, a fertilizer carrying no or only a small amount of nitrogen is advisable. Nitrogen may stimulate surviving grasses so that they make undue competition for the legumes. This is particularly true if there is some bluegrass in the field. Topdressing grass and legumes in the years following seeding, particularly to supply needed potash that cannot be stored in the soil, is a must.

For hay or summer pasture, a good seed mixture for spring seeding is alfalfa 6-10 lbs., Ladino ¼–1 lb., and timothy 6 lb., or bromegrass 8 lb. For a summer seeding the timothy would be cut in half. For an all season pasture for nearly continuous grazing the alfalfa may be omitted. However, even though the alfalfa goes out in a year or so under this management there are advantages in including it. The deep roots of the alfalfa add materially to the soil rebuilding value of the seeding. Alfalfa will also materially increase the early production from the field. For an all season type of pasture and for long life Birdsfoot trefoil bids fair to be the best legume. The seeding rate is 3-4 pounds per acre. Thorough inoculation of this legume and alfalfa as well is essential.

Clip the seeding once or twice the first season to remove weed growth. The field may appear weedy and even unpromising until clipped. Grazing may be substituted for clipping if not overdone. In a favorable season some hay may be made the first season. If so, the cutting should be made before early September.

The country's sheep population increased during 1950 for the first time in eight years. Stock sheep numbers showed an over-all increase on January 1 of 4 per cent over a year earlier. A 14 per cent increase in ewe lambs foreshadows a further expansion in sheep production during 1951.

The Answer To One Haying Problem

Condensed from Capper's Farmer

M. N. Beeler

Two men walked into the Weix Farms calf barn. The little Holstein heifer didn't even glance their way. She was too busy eating hay. It was good. You could tell by the way her head bobbed.

Haller, farm manager, took a section of bale from the rack as the calf gulped a mouthful and reached for another.

"See that?" Haller's thumb crimped a stem between his fingers. "Flat, split and pliable." Then he pulled the flake open. It was pea green, jam packed with leaves, fine stems—the kind of hay that puts sparkle in a heifer's eyes, gloss in her coat.

"We got up 160 acres first cutting, 140 second and 160 third without rain."

The other man seemed a little skeptical. He remembered how farmers nearly always had to fight rain at haying time.

Haller explained that Weix Farms has a system that takes much of the rain risk out of haying. It takes most of the hard work out, too. The system is just about mechanized.

A hay crusher is a big part of the Weix Farms system. This is the machine that picks up the swath right back of the cutterbar, passes it thru rollers and lays down a ribbon of hay behind. Rolling cracks the stems so they cure about as fast as the leaves do. Haller believes this machine is the key to good quality in field curing.

F. W. Duffee, Wisconsin engineer, says that we need a system for making quality hay in the field, and we need machines to take the drudgery and expense out of the job.

Have Weix Farms found that system? Maybe so. Or maybe they're not far off.

Recommended start for first-crop haying in Dane county, Wisconsin, is June 18. That's just at the rainy season.

"How it rained last year," said Haller. "But all our hay was in the barn. Started 3 weeks early, May 26."

Then he outlined the system:

1. Start haying in time to get thru by June 16 or 18.

2. Watch the weather. Haller calls the Truax Field weatherman every 3 hours or so. He's about 85

Reprinted by permission from Capper's Farmer,
Topeka, Kansas, August 1950

percent right on forecasts. Also he gets reports from fliers. If any pilot has spotted a shower headed in Haller's direction, he stops cutting until the threat passes.

3. Lay down only what can be baled in a day. With the automatic twine tier, that'll be about 25 acres.

4. Start the power rake in tedder gear 15 minutes behind the mower-crusher.

5. Side-deliver the hay while it is still a little damp and finish curing in the windrow.

6. Under this handling first-crop alfalfa cut at 10 o'clock one morning will be ready to bale the next afternoon. For second and third crops the curing time is less. Last year Haller had 8 days in which he cut in the forenoon and baled in the afternoon.

Ladino is harder to cure than alfalfa. But with the crusher the hay is ready to bale in 1½days.

7. Pick up bales with automatic bale loader.

"You see by this system we get the rain on the growing stubble instead of the hay," he said. "Early start on the first crop makes the second just about that much earlier. So we can take a third. Total 6 tons an acre from 3 cuttings last year." Most farmers in that section get only 2 crops.

Protein of the first-cutting alfalfa last year was 17 percent, second 18, and third 19 and of ladino 24 percent.

High protein roughage saves on supplements. Grain ration is mixed to 14 percent. That's 1½ percent less than the old ration, before the new haying system was worked out.

Cows get a bait of first cutting once a day and second cutting the other feed. They clean up one as well as the other. Haller thinks the first is just as good as the second cutting. That's just plain unreasonable to most farmers. But look at the protein figures again. Besides, the first crop is cut young, before it gets stemmy, and it is cured quickly. That means high quality.

Weix Farms operate a pig nursery—sell weanlings to farmers who don't want to raise their own feeders. The 200 sows get a grain mix containing 40 percent alfalfa meal ground from the second cutting hay. Grain and supplement go into separate feeders. Sows take the high percentage alfalfa mix of their own choice.

What does that do to hog ration costs? Haller put the average for the year on all sows, pigs sold and pigs on hand at $2.06 a head.

Is it any wonder after 5 years of making that kind of hay, Haller says he wouldn't be without the crusher?

Concentrated Milk

Condensed from The Farm Journal

Cameron Hervey and Vernon Vine

A TAXI driver in Wilmington, Del., stopped at a grocery store the other day to pick up some milk. Instead of the usual two quarts—enough for a day—he carried out enough for a week. It was *concentrated milk,* done up in squatty little waxed paper boxes, *easy to carry, easy to store in the refrigerator, and something that will keep for three weeks.*

What's more, when his wife mixed it with two parts of water, his children couldn't tell it from ordinary milk.

Concentrated milk is not condensed or evaporated or powdered, but a new product—fresh milk with all its butterfat and solids left in, but with three-fourths of the water taken out.

This concentrated milk may be the first gun in a revolution that will shake the dairy business right down to the milk stool. And all for the better.

Other big guns are being loaded right now. A concentrated *frozen* milk in tin cans is nearly ready for market tests. *Canned whole milk,* that may need no refrigeration, is nearing commercial production. *Powdered whole milk* is being improved.

Taking the combined effect of all three, if all succeed on the market, here's what they may do for you:

They may increase the demand for milk, wherever you live.

This means that if you're now producing milk for cheese or butter, these new products may give you a better chance to get fluid milk prices.

They may make it possible for you to get fluid milk prices, even if you live outside a city milkshed, if new processing plants are established in so-called "factory milk" areas.

It all depends on consumers. Here are the advantages for them:

The concentrates, which weigh so much less, and are so much less bulky than regular milk, make it handier for homemakers to buy milk in grocery stores, and thereby save money over home-delivered prices.

The small packages make it easy to store a week's supply at a time in the refrigerator. (The powdered and canned whole milk

Reprinted by permission from The Farm Journal,
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may not need refrigeration at all.) The concentrated products can be used in more ways than regular milk.

Concentrated milk, developed after seven years' research by the National Dairy Products Corporation, is being tested in Wilmington. Tests in Ashtabula and Lima, Ohio, will start soon. It's still too soon to say how many buyers will become regular consumers.

But in Philadelphia, 150 families have already tried it for three months, and 95% said that they liked the concentrate as well as or better than regular milk. Many couldn't tell the two apart.

You can use it full strength for cooking. You can take two different weights of cream off the same bottle, and still have whole milk left—the concentrate, of course, is homogenized.

For a child who doesn't like milk, a mother can mix it one to two with soda pop, and still give him the nutritive value of a full glass of milk.

How long before you will see the concentrate in your town? That depends partly on what the new product can sell for. Right now, there's some saving in the cost of smaller containers, and in transportation, but the cost of concentrating must be added. It's done with a vacuum pan at temperatures low enough not to give a cooked flavor.

Also, it depends on where the concentrating will be done. National Dairy operates, generally, in larger cities east of the Mississippi. Whether it will license other companies to use the process isn't known yet. Others could use it right now if they knew the process; nor is the equipment expensive.

For a long time now, scientists have been trying to cut down the bulk of milk by taking out the water. They've done it in various ways—in evaporated milk, for instance—but the taste has never equalled that of fresh milk.

A frozen concentrated milk is what many companies have been working toward, especially after seeing the phenomenal success of frozen orange juice.

The thing that has kept frozen concentrate off the market so far has been a slightly flaky, curdled appearance in the reconstituted milk, even though it is perfectly sweet. If left standing after it has been diluted it may develop off flavors.

One large food company has announced that it is close to a solution. Its product is much like National Dairy's, except that—being frozen—it can be stored for five or six months.

The president of a large frozen-foods corporation, John Fox of Minute Maid, calls the frozen milk concentrate the most exciting potential product in the industry, and says that it could be

sold for less than fluid milk. For one thing, he said, surplus milk could be concentrated, frozen, and stored during the summer months when feeds are cheap, and milk too plentiful.

This new product may open up a big market in foreign areas that are short of fresh milk. For example, National Dairy right now is flying fresh whole milk down to Venezuela, South America.

Whether consumers here at home prefer a concentrate, frozen or unfrozen, remains to be seen. And newer kinds of *canned milk* may soon steal part of the show from the concentrates!

At least one company, Avoset of San Francisco, is producing canned whole milk and cream which it claims will keep sweet for months without refrigeration. So far, the Avoset products have been sold at premium prices, largely in foreign markets and to members of the armed forces and their families overseas. Since the process is expensive, and since Avoset will not license its patents, other methods of milk canning are being rushed into production.

Probably the most important of these is one which was developed by Dr. Roy Graves, former head of the USDA's Division of Dairy Cattle Breeding, and his partner, Jack Stambaugh.

The Graves-Stambaugh process will go into production soon in East Stanwood, Wash. Three other plants in the same area will be built soon and at least 25 others are planned for elsewhere in the U.S.

In this process, milk goes directly from the cows through a pipeline and into a 100-gallon double-walled stainless steel tank, which is under vacuum. The milk isn't cooled. At no point is it exposed to air.

Haulers from the East Stanwood plant will pick up the full tanks after every milking and will leave empty, sterilized replacement tanks.

At the plant, still without exposure to air, the milk will be standardized, homogenized, flash-sterilized at 280 degrees Fahrenheit for six seconds, cooled to 100 degrees, and canned.

A *Farm Journal* editor who tasted the final product says that he couldn't tell it from fresh, pasteurized milk. It doesn't have the caramelized flavor of condensed or evaporated milk. It has a higher vitamin C content and softer curd than ordinary pasteurized milk.

Most important, the product is guaranteed to keep six months under ordinary refrigeration. Actually it has kept six months, and longer, without any refrigeration. (Last July, Graves drove from Indiana to Washington, with canned milk in the trunk of his car that had already been stored in a refrigerator for a year. On arrival,

the milk was fresh and unspoiled.)

The East Stanwood plant will probably ship part of its product to Alaska, where milk presently sells for 50¢ to 60¢ a quart—when it's available.

Other ways of preserving milk may have promise. Powdered whole milk, for instance, isn't the off-flavored concoction that GI's got during the war. At Washington State College, a *Farm Journal* editor recently tasted a reconstituted whole milk powder that had been stored for two years at 45 degrees F. The powder dissolved in water almost immediately, and without shaking. And although the product was slightly chalky, it came fairly close to fresh milk quality. The chief problem now is how to store it at room temperatures.

By electronic bombardment, one group of scientists claims to have kept milk, meat, fish, fruits, and vegetables fresh and appetizing for as long as four years without refrigeration, and the machine they used is big enough for quantity production.

Sterilization by ultrasonic waves (high frequency sound) is being tried.

Even the antibiotics, those disease-killing drugs that we get from the earth, have been used along with mild heat in milk canning experiments. Subtilin looks like the best one, but so far seems impracticable.

Almost everyone has cause to be happy over this impending revolution in the dairy industry. Dairy farmers should be able to produce more milk and get a better price for it. The consumer stands to get more, better, and cheaper milk.

As milk becomes more easily transportable, and as it can be made to keep much longer, however, our dairy centers may shift to areas where production costs are lower.

This "milk revolution" is something that every dairyman might well watch.

Acre Of Grass—Ton Of Beef

Condensed from The Ohio Farmer

D. R. Dodd

THERE has been considerable talk about how much beef might be produced on an acre of grass. Much of my time since last May has been spent on a grassland survey sponsored jointly by the Ohio State University and the Middle West Soil Improvement Committee. Field trips in connection with this survey have taken me to many farms throughout the eastern part of the United States. On these trips I have learned of many cases where five, six or seven hundred pounds of beef have been produced from an acre of grass. Occasionally the figure was higher.

I finally took a trip to Florida. That topped the list! At the Everglades Experiment Station, Belle Glade, Florida, over a five-year period they had an average production of 1804 pounds of beef per acre. The highest production was 2089 pounds for one year.

I have been wondering whether it would be possible, under Ohio conditions, to produce as much as 1000 pounds of beef on an acre of pasture in a year. If Florida can produce 1800 pounds, possibly someone in Ohio will yet reach 1000 pounds.

Such high production is certainly interesting. However, of much greater practical value is certainly the increasing of our average production. At present it is less than 200 pounds of beef per acre.

We need extra production. It seems logical to make our grasslands carry more of the livestock load. Numerous farmers have already demonstrated that it can be done. With proper improvement of our cropland and permanant pastures there seems little doubt that we might be able to produce twice our present volume of livestock products. We could also do this at lower cost.

Naturally, we will not get all of this increase in a single year. It involves liming, fertilizing and seeding operations. There would also be the need for additional livestock.

At the Everglades Experiment Station in Florida, the director, R. V. Allison, a native of Ohio, took time from a busy schedule to show us the work in progress there.

The Everglades constitute the

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largest area of muck and peat land in the world. The climate and the water supply are favorable for grass growth. In addition to the extensive work here with the breeding, testing and production of cultivated row crops, an extensive pasture and livestock production program is also in progress. Brahman, Angus and Devon herds are maintained.

The grassland program has the advantage of conserving this type of soil which is so rapidly destroyed by truck, cane and other row crops. During the past 25 years the depth of muck on many intensively farmed areas has been reduced by as much as 25 per cent.

In this muck area the liberal use of mineral fertilizer running high in potash such as an 0-8-24, reinforced with minor elements, is the rule. Celery, for example, may receive as much as 3000 to 4000 pounds per acre. Farmers, therefore, who elect to produce grass are already schooled in the idea of liberal fertilization.

St. Augustine grass is one of the best producers. More than 2000 pounds of beef per acre per year with a 5-year average of 1804 has been produced by rotational grazing of this grass at the Everglades Station. Other good grasses here that fit in certain situations are Pangalo, Coastal Bermuda, Carib, Para, and Pensacola Bahia. The chief lesson to learn here it seemed to me was that grass adequately treated and utilized by good livestock conserves soil and is a profitable crop on even very high priced land. That the results of pasture research were carrying over to farmers was evident in the fine pastures and excellent Brahman cattle observed on the farms of VanLandingham Bros., and others about Belle Glade.

A long-view water conservation and control program already well under way for the Everglades will probably result in South Florida becoming one of the most extensive areas in the state and nation for the intensive production of truck and fruit crops and dairy and meat products.

New Design For Living

Condensed from Nation's Business

Dickson Hartwell

No one knows precisely who started it. But recent visitors to Georgia, Tennessee and adjacent states are witnessing a kind of revolution. People there have discovered a new way to live together. It has improved their surroundings, made more money for them and, for many, transformed their lives.

Five years ago gray, alert Mrs. Minnie Taylor was probably the loneliest woman in Georgia. Certainly she was the most forlorn in Liberty, the 52-family hamlet where she lived. Like millions of others, she was starved for companionship, for people to talk and plan and share with. Not once in her 50-odd years had there been a social gathering in her hill country community. Only at church or Sunday school was there a chance even for a snatch of gossip.

"I used to sit at home just waiting from one Sunday to the next," Minnie Taylor says. "There was nobody even to holler to."

But today there is relatively as much excitement in Liberty as in Times Square on Saturday night. No longer lonely, Minnie Taylor is in the thick of it. She and almost everyone else in the community are active members of some committee and more than 80 meetings are held annually. For the first time in 116 years Liberty people are working together and having fun being neighbors.

What is happening in Liberty is happening in a thousand other places, in big city suburbs, factory towns and rural areas. It began in 1944 with a simple idea. Sparked by the chamber of commerce, Knoxville, Tenn., civic groups offered prize money to stimulate better farming. The idea—a contest—was ancient, but this one had a novel twist. Instead of pitting farmer against farmer, it called for organizing groups of neighboring families into permanent communities. Each year these communities would compete against each other on self-improvement.

This little twist did the trick. Realization that it's more fun to work with your neighbor than against him burst on the people around Knoxville like sunshine. Where old-style contests had met

Reprinted by permission from Nation's Business,
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with apathy, the new idea prairie-fired. With donated local and regional prizes soon totaling thousands of dollars, the contests now cover all of Tennessee, half of Georgia and parts of Alabama and Virginia. In 1951 they are spreading throughout Arkansas. After a recent survey of results, an amazed investigator of the conservative Federal Reserve Bank of Atlanta termed the contests, "a phenomenal success."

In the country around Knoxville, Nashville and Atlanta I recently saw farms in contesting communities that five years ago were gutted by erosion and overgrown with brush and sage that are now lushly verdant. I watched fattening beef cattle, sturdy hogs and high-producing cows grazing where scrawny razorbacks had once gone hungry. Tobacco Road shacks have changed magically into spick-and-span white cottages.

But most important is what is happening to the people. It shows up in little things. In Liberty, for example, a man used to meet his troubles alone. Today trouble has the whole community to fight. When 77-year-old Jim Loggins fell ill his neighbors harvested his crops. Ed Duncan hasn't been well for months but he hasn't been hungry — the community club sees to that. After his ornery mule bolted, Ed Taylor was hospitalized with a stubborn shinbone infection. Neighbors butchered his fattened hogs, gathered his corn and chopped his wood all winter. When spring came they planted his crop. It cost him nothing. Now Ed is well. No one has to tell him, "Love thy neighbor."

Though there are those who would like to see the contest limited strictly to agricultural communities, some factory towns have entered the competition. Mascot, Tenn., largely owned by the American Zinc Company, is one of them.

In 1948 the morale of Mascot people was low, much of the air was heavily polluted with limestone dust, there wasn't a single playground or recreation facility and despite money-losing expenditures by the company, the houses were in a dismal state of disrepair.

Today Mascot has a concrete tennis court, a reconditioned library, a children's summer playground staffed by two paid supervisors, a weekly movie, a monthly square dance, two school basketball teams and a state championship baseball team.

The community hired an engineer to design a new school lighting system. Lacking a picnic spot, they cleared a five-acre tract of underbrush, set out lunch tables and outdoor cooking grills. Dust-control devices were installed at the plant. Borrowing spray equip-

ment from the company, the contest committee offered to paint any man's house, company-owned or not. In a few hours evil six-room eyesores were converted into creditable homes.

As the drab town brightened, more people took part. Men living in company-owned houses who once swore to "let the dump cave in before I'd spend a dime on it" got out tool kits and built shelves, repapered and painted, closed in old-fashioned, claw-footed bathtubs, sanded and waxed floors. They put modern plumbing in company-owned houses!

Employes who once used spare energy grumbling against the company uncovered real grievances against the county school board: a lunchroom that leaks during frequent rains, sagging floors separated six inches from baseboards, a seepage of water from the boys' latrine to the kitchen. When the county school supervisor refused to inspect the premises, they hired a photographer, took damning picture evidence and carried it in a body to her office. They got action.

"Nobody here thinks of Mascot as a company town any more," Bill Armstrong, community chairman told me. "It's our town. We can make it as good as we want it to be."

Being thus organized for group action community clubs undertake unusual civic responsibilities.

In Tennessee, the Mt. Lebanon club members checked on a nearby poor farm and were shocked at filth, infestation and lack of sanitation in a firetrap building. Mrs. Minnie Buchanan and Miss Elsie Hudson were sent to arouse every club in the county. With photographic documentation, a delegation met county officials. "We represent 500 families," they said. "We want something done." Christmas, 1949, the inmates moved into a new fireproof $30,000 building.

Community groups go right to the top. Little 60-family Sharon, Tenn., badly needed improvement of an often impassable county road. A committee of five was appointed to appeal to then Gov. Jim McCord in person. But instead of five, a delegation of 75 showed up. The governor met them in the senate chamber and told them, sorry, he couldn't fix their road.

But the once meek Sharon people refused to accept his brushoff. They harassed him with pesky facts he couldn't turn aside. Annoyed that a pip-squeak community was so troublesome McCord's temper mounted. Then Sharon's tall, handsome Mrs. Harry Bracey rose and calmly pulled the facts together. Farmers were forced to take their tobacco to a more distant market; people couldn't get to church;

they were deprived of a needed bus line; schoolteachers hesitated to accept jobs in Sharon; everyone was blocked from convenient shopping areas. They got the road.

Such achievements impress contest judges who spend several weeks minutely comparing progress among the contestants. Points are scored for improved farming methods, increased family food supply, home beautification and modernization, effective club organization and community recreational facilities. Prizes for county, regional and state winners, raised and donated by sponsoring chambers of commerce, range from $25 to $1,000.

Community clubs make elaborate progress reports to the judges, omitting no detail that might be worth a point. Some, from the back country, are proudly printed in crude frontier lettering. A long list from Bean Creek near Lynch Mountain in northern Georgia ended with these items:

—Millie Garrett have two new bed spreads and two new rocking chairs.

—Charlie Anderson have new curtons and a new refrigerator.

—Alice Goldwire have covered hur smokehouse.

But the sense of well-being that springs from such things as new bed spreads, inside bathrooms, brightly painted houses and a high development of civic responsibility is enhanced measurably by the effect of the contests on the income of the participants. Fertile farms and improved techniques pay big dividends and dozens of farmers told me the contests had helped them make more money. With the advice of agricultural agents, crops are balanced, purebred stock is purchased and land terraced and pastured to curb erosion. As one man explained: "When your neighbors start fixing up, you've got to do it too. Nobody wants to be the drag tail farm."

Joel Fort, manager of the Federal Reserve Bank, Nashville branch, and an enthusiastic contest backer, told me that a partial analysis from central Tennessee alone showed that in three years contestants spent $2,060,000 for home furnishings, $2,022,000 for electrical equipment, $6,682,000 for home building and repairs and $4,462,000 for new farm machinery. Much, if not most of this, he says, was stimulated by the contests.

Realistic Assistant Secretary of Agriculture Knox T. Hutchinson made an on-the-spot checkup. "These contests are revolutionary," he said. "The important thing is the people are doing it for themselves. *There is no government bonus and no subsidy.* They've found by working together they can literally lift themselves by their bootstraps."

Even sponsors are amazed at the competitors' enthusiasm. On the eve of an annual prize award banquet at Nashville's Maxwell House, a sleet storm swept the state, icing roads and disrupting communications. A glum banquet committee of the Nashville Chamber of Commerce met the next morning. With 600 reservations the consensus was maybe 100 would show up. At this gloomy moment a delegation of cheerful contestants burst into the meeting. They were going to "do the town" before the banquet. Where had they come from? Why from near Sparta, 100 miles away. "Roads were a little skiddy," the chairman reported, "but we wouldn't miss this for anything. We expect to win first prize." The banquet committee relaxed. There were 550 at the dinner.

Business men visiting contesting regions have seen the results and returned home, inspired, to initiate the idea in their own areas through their local chambers of commerce. Large organizations like the Atlanta Chamber of Commerce, through its Farmer's Club, supply a full-time staff member to aid the communities and cooperate with county farm agents. Community committees are organized usually after a single meeting at which a representative from a successful group describes his organization's accomplishments. The contests have spread into five states almost entirely by local, word-of-mouth publicity.

The biggest problem in the communities is money—money to build baseball grounds, equip school lunchrooms, rebuild and repair churches, erect auditoriums and gyms, basketball and croquet courts. Emergencies arise, too, as when the folks in Nacoochee Valley in the Georgia Cherokee country learned they were losing their school after a county political shift. They went into action and fixed a questionable water supply by deepening a well. For $96 the oozing sewage system was repaired. The hot-water heating plant was overhauled for $125. Willing hands and $400 in cash rebuilt and refurnished a condemned primary building, equipped it with bought and borrowed appliances for a domestic science department. They scraped up $30 for a library fund and put out a precious $300 for three new typewriters. They canned vegetables to stock the lunchroom. Then they defied officials to condemn their school as substandard.

Raising these and larger sums calls for ingenuity and persistence. A favorite social affair is a cakewalk. Bidders pay from ten to 50 cents to walk a circle around a table laden with cakes donated by neighboring womenfolks, hoping to be standing on

a winning number when the walk is whistled to a stop. They hold fish fries, square dances, auctions and amateur vaudeville nights. One community wheedled the vending machine concession in a nearby factory and nets a fabulous $100 a week for local improvements. To raise $510 for a church heating unit—a vast sum in a hamlet with an average Sunday collection of $1.25—a patchwork quilt was designed. Twenty-five women took a patch each, to embroider on it the name of anyone who gave them money. In three weeks $850 was raised. One woman sewed 133 names into her single 18-inch-square patch.

Many communities have special songs, prayers and slogans to epitomize the spirit of the contests. Characteristic is the homespun, humble motto of one little community: "We do the best we can where we are with what we have."

Most inspiring of all is the new spirit of neighbor-help-neighbor. Near famed Kennesaw Mountain a few miles out of Marietta, Ga., Agnes and Homer Chandler are happy together because of devotion, faith and the sudden change the contest made in their neighbors. Spinal meningitis cut Agnes down when she was five, and put her on crutches for life. But Agnes had spunk and beauty and after two years at North Georgia College, she met and married tall, stalwart Homer Chandler, an Atlanta fireman. Suddenly Homer was struck with functional paralysis. For 23 years he has been dependent on crippled Agnes.

With no money but a $20-a-month pension plucky Agnes got a sewing machine though her feet were useless to pump it. She found a way. With her right hand on her knee and her foot on the treadle, she pushed her leg up and down, running the heavy machine with the muscles of her slender arm and shoulder. She learned to sew with her left hand!

For 20 years Agnes pumped away making dresses and pajamas at $1 each. Neat as a pin, she swept, dusted, mopped on crutches. But in rain or freezing weather it was a long way to the outside privy, and even longer for paralyzed Homer. On his good days Homer could carry a little wood for the stove but pulling water up on the spindle of the old well took a whole man's strength. Neighbors stopped by to draw a bucket—whenever they thought of it.

"When we ran out of water we'd just wait and pray," says Agnes.

Then one day shy, lanky Magood Mabry, community club president, stopped by. "We've joined the contest," Mabry said. "We can start improving right here."

The club put a pump in the well and a sink in the kitchen. The day water flowed Agnes had to shoo Homer away from the sink with a broom. Ecstatic, he wanted to let it pour over his hands and arms. But club members didn't stop there. They ripped out the old, back-breaking wood stove and installed a new one—electric. They sectioned off an unused storeroom and put in a flushing toilet. There is a small washing machine. Neighbor Betty Dickinson donated a wheel chair. Best of all there is a new electric sewing machine.

Any visitor in the South can readily see the freshly painted barns, the green acres and the strong, straight fences. The people tell eagerly, too, of the thousands of new bathrooms, the shelves of home-grown food, of their newly decorated homes, and modern, fully mechanized kitchens. But these physical accomplishments aren't the real story. It is found in the reply of a little Georgia lady when contest judges asked, "What is your community's outstanding accomplishment?"

She knitted her brow and puzzled a moment. Then her eyes brightened. "I believe," she said, "it's that we've learned to love one another."

Cutting Costs of Raising Turkeys

Condensed from Turkey World

Loyal Payne
Kansas State College

With the margin of profit declining each year, it will become increasingly important that the cost of producing market turkeys be reduced to a minimum. Growing smaller birds at less cost per pound might be worthy of consideration.

Would you believe that turkeys could be grown to maturity without any animal protein such as meat scraps, fish meal, or milk, or that satisfactory growth could be obtained with nothing but milo, grass and water after 20 weeks of age? Results of the fourth annual feeding trials at Garden City (Southwest Kansas), last year demonstrated that Vitamin B_{12} can be used in the diet as a substitute for animal protein, and that the cost of producing turkeys can be materially reduced by feeding a grain and grass diet only after 20 weeks of age.

The 1,000 Broad Breasted

Reprinted by permission from Turkey World,
Mount Morris, Illinois

Bronze and 200 Beltsville Small Type White turkeys in the test were started on the experimental rations April 6, and continued to October 19, at which time they were 28 weeks of age when the experiment ended.

Each of the six lots of 200 poults was brooded and reared in a 12 × 16 ft. portable brooder house, equipped with air blast oil burning brooders. The 1 × 2 in. welded wire floor was covered with crinkled paper for the first few weeks, after which it was removed. The turkeys were confined in the houses until about four weeks of age, when they were given small outdoor gravel covered runs. At eight weeks of age the six houses, which had been lined up in a row for convenience, were moved to their respective yards of about three acres each. After this the turkeys were given the freedom of their pen, with some western wheat grass forage for all except Lot 5, where there was ample Sudan grass forage until the first of October, when it failed to grow after mowing. Lot 6 was deficient in grass pasture during most of the growing season. After 16 weeks of age the toms and hens were grown in separate pens and both sexes were moved to unoccupied yards every two weeks thereafter.

Lot 1, the control group, received a mixed grain ration consisting of corn, wheat, and oats, while Lots 2, 3, 4, 5, and 6 were fed milo as the principal grain in the diet. These grains were finely ground when added to the dry mash mixture and fed whole in hoppers after the eighth week. In preparing the mash the ground grains were supplemented with protein, vitamins and minerals to provide a balanced diet. The protein level of the mash fed to each of the six lots was approximately 28 percent the first 8 weeks, 20 percent the 9–20th weeks and 16 percent the 21–28th weeks, except in Lot 5, which was about 11 percent protein after the 20th week.

The proportion of whole grain fed to the control group, Lot 1, consisted of 40 percent yellow corn, 40 percent wheat and 20 percent oats, and these three grains comprised 81 percent of the total feed intake to 28 weeks of age. Ground corn, wheat and oats were also used in the mash mixture to the extent of 40 to 72 percent, varying in amount for the three periods mentioned above.

Milo was the basal feed in the other five lots, with the following variations: Lot 2, highly efficient diet the first 8 weeks. Lots 3 and 4 were the same as Lot 1, except milo was substituted for corn, wheat and oats, which materially reduced the cost of the mixture. Lot 3 was composed of 200 Beltsville Small Type White Turkeys. All other lots were Broad Breasted

Bronze. Lot 5 was fed milo, grass and water only for the 21–28 weeks period, while Lot 6 received plant protein (soybean oil meal) throughout the growing period. Vitamin B_{12} was used in Lots 1–5 at the rate of one-fourth pound per 500 pound mix and in Lot 6 at the rate of one-half pound per 500 pound mix for 1–20 weeks and none thereafter. None of the antibiotics were used in any of the lots. The amount of milo consumed in the total diet for Lots 2, 3, 4, 5 and 6 was 77-71-73-78 and 71 percent, respectively.

The results for each lot during the 28 weeks growing period may be seen in the table.

Results in Kansas Feeding Trials

Lots	1 CORN WHEAT OATS	2 MILO Highly Effic.	3 MILO Small Type	4 MILO	5 MILO no mash after 20 wks.	6 MILO B_{12}
1. GRAIN & MASH consumed per bird. Lbs. ..	79.61	70.64	55.69	74.53	69.88	72.19
2. AV. WT. MALE & FEMALE at 28 wks. Lbs.	19.18	17.71	12.37	18.01	17.69	17.29
3. Pounds of FEED PER pound gain	4.15	3.98	4.50	4.12	3.95	4.17
4. COST of MASH/100 ...	$4.11	$3.55	$3.54	$3.54	$3.69	$3.46
5. COST of GRAIN/100 ..	3.42	2.30	2.30	2.30	2.30	2.30
6. FEED COST/LB. GAIN	15.83¢	11.93¢	13.52¢	12.17¢	11.33¢	12.28¢
7. RANK—lowest to highest cost	6	2	5	3	1	4
8. Mortality, per cent	10.1	24.4	16.3	19.4	20.9	32.5
9. PERCENTAGE of both sex in each U. S. Market Grade AA & A	94.1	94.2	92.9	95.8	90.3	90.1
B	5.9	5.8	6.5	3.6	8.5	8.5
C	0	0	.6	.6	1.2	1.4
REJECTS	0	0	0	0	0	0
Total	100	100	100	100	100	100

It will be seen from the above figures that the turkeys in Lot 1 consumed more feed per bird than any of the others. In previous experiments where oats were used feed consumption was high.

The weighted average size of toms and hens at 28 weeks was less in 1950 than for any of the previous tests, due in part to a marked decline in the protein level from 9 to 28 weeks. This resulted in slower growth but cheaper gains. The 1950 season was also the wettest and coldest spring and summer on record in the Garden City area. The Small White turkeys averaged 4.6 pounds per bird less in weight than the Bronze.

There are those who maintain that the small turkeys are finished and ready to market at 24 weeks of age. In these feeding trials the small turkeys would have averaged 11.37 pounds each on a feed

consumption of 43.19 pounds each, or 3.8 pounds of feed per pound gain when 24 weeks old. While the White poults cost 5 cents less than the Bronze, the labor, brooding and overhead costs were the same for both lots.

The feed required per pound gain was least in Lots 5 and 2. The Small Type turkeys, Lot 3, required the most feed per pound gain.

The corn, wheat and oat mixture, Lot 1, cost considerably more per 100 than the rations which consisted largely of milo, used in the other lots. Local retail prices were used in calculating the cost of ingredients in all rations, with 25 cents per 100 pounds added for grinding and mixing the grain used in the mash mixtures. Most of the corn and oats fed were shipped long distances, which increased the cost over milo, which was grown locally. Wheat was also a local product, but the support price kept the cost much higher than for milo.

The feed cost per pound gain was the lowest in Lot 5, fed grain and grass after 20 weeks of age. Lot 2, highly efficient, ranked second and the rating for the others is listed opposite figure 7. The Small White turkeys showed a feed cost of 13.52 cents per pound at 28 weeks or 11.78 cents at 24 weesk of age.

The mortality for all lots was 19.6 percent. Heavy losses occurred in Lots 2, 5, and 6 the first week as a result of brooder stove trouble. Predatory animals destroyed 49 turkeys in August, most of which were in Lot 6, and blackhead was listed as the cause of 42 deaths. Other losses were attributed to miscellaneous causes.

After the turkeys were killed, plucked, and chilled by a commercial processor, they were graded according to government standards with the results listed. There were no breast blisters, crooked backs, crippled legs or rejects. Only two had slightly crooked keels. The last joint on one wing of each bird was clipped at one week of age. This prevented flying on top of the brooder houses and sun shelters. The males and females were reared in separate lots after 16 weeks of age. It is possible these two practices eliminated defects in the mature birds.

1. The turkeys in all lots were smaller this year than in previous years, due in part to a marked decline in the protein level from 9 to 28 weeks. Results, slower growth but cheaper gain.

2. The largest turkeys were produced in the Control Lot 1, fed wheat, corn, and oats. They weighed 1.5 lbs. more, or about 8.5 percent more than the other Bronze. The small type Whites averaged 4.6 lbs., or 34.4 percent less than the Bronze.

3. The Lot 2 birds fed the highly efficient ration the first 8 weeks weighed slightly less than those in Lot 4. The former ration contained 4.26 percent fiber and the latter 6.22 percent fiber the first eight weeks.

4. The turkeys in Lot 5, fed milo, grass, and water only, after 20 weeks of age weighed practically the same as the birds in Lot 2. Those in Lot 6, no animal protein in diet at any time, weighed slightly less than the other Bronze lots, but this group had practically no green feed during the growing period while the others did have. There were no antibiotics in the B_{12} they received.

5. Most economical gains were obtained in Lot 5, with a feed cost of 11.33¢ per pound gain. Lot 2 was second with 11.93 and Lot 4 was third with 12.17¢ per pound gain. The turkeys in Lot 1 cost the most to produce, due to the high price of corn, wheat, and oats, compared with milo. At 23¢ for toms and 32¢ for hens, prevailing prices in the vicinity at conclusion of experiment, Lot 1 shows a return above feed cost of $2.02 and Lot 5, $2.70, or 68¢ more per bird.

6. These figures indicate that 75 percent milo can be fed in the turkey diet with reasonably good results.

7. These results confirm those of the previous three years by showing that the local grains produce the most economical gains. While milo was used, due to its abundance, as the principal grain in five of the lots, previous experiments have indicated that other grains such as corn, wheat, or kafir gave results comparable with milo. Any of these grains could be fed singly or in combination with good results. Quality being equal, the cereal grain available at least cost in any community could be used as the whole grain portion of the diet.

The cost of growing turkeys can be reduced, according to these results, by feeding a 28 percent protein mash mixture the first 8 weeks, 20 percent protein 9 to 20 weeks and grain and green feed containing 10–12 percent protein after 20 weeks of age. The Bronze turkeys in this experiment consumed, as an average 73.37 pounds of feed each, of which 33.08 pounds, or 45 percent, was eaten after the birds were 20 weeks of age.

How We Buy A Bull

Condensed from American Agriculturist

Douglas R. Stanton

PRIOR to 1949, the actual procedure for selecting bulls for our artificial breeding program was as vague to me as to many of the other 30,000 dairymen-members throughout New York State and Western Vermont. With my election to chairmanship of the Guernsey Sire Committee of the New York Artificial Breeders' Cooperative, Inc., came a realization of the amount of responsibility attached to the job.

Any one of the bulls I was to help select might ultimately sire thousands of offspring. A desirable transmitting sire was in a position to do untold good by increasing production, improving the dairy type of offspring, and producing longer-lived animals. On the other hand, an unwise selection might do the opposite.

I soon learned that certain standards, practices, and safeguards already established not only tended to prevent poor selections, but limited the use of young analyzed sires until their transmitting ability under artificial breeding conditions was thoroughly established. I also learned that plenty of help and guidance was available to every sire selection committee chairman, not only from his fellow members, but from the Animal Husbandry Extension Department at Cornell, as well. A practical background of dairy knowledge so essentially necessary to this job was provided by my experience as a 4-H dairy member, and as a dairyman with my own producing herd of Guernseys on Old Homestead Farm at Greenville, New York.

First of all, I found that sires selected for use in the NYABC Stud at Ithaca fall into one of three groups. Serving as the foundation upon which our cooperative breeding program is based are the "great herd-improving sires" which have favorable dam-daughter comparisons.

What we call "bulls-in-waiting" make up the second group. These bulls are purchased from owners who are ready to sell before proofs are completed, and only when the committee thinks after checking the daughters' type and early production records and the pedigree of the bull itself, that the bull will turn out to be a

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Ithaca, New York, May 19, 1951

herd-improver. NYABC "bulls-in-waiting" are used lightly until they become favorably proven, then are put into full extensive service.

Young analyzed sires—sons of desirably proven sires from thoroughly studied cow families—form our last and smallest group. Selected because of our obligation to the dairy world to contribute to the limited supply of desirably proven dairy sires, these young fellows serve just enough animals so a proof will later become available. They then join the "bull's-in-waiting" until a proof is available on them.

The Animal Husbandry Extension Department at Cornell plays an important part in good sire selection. When a dairyman offers a bull for sale, a member of the staff gathers all the facts he can about the animal, converts all records to a standard two-time-a-day, 305 day, mature equivalent basis, and makes at least three studies.

First, he compares all daughters and all of their dams, using all of the records. Then he compares the two-year-old records of the daughters with the two-year-old records of the dams. Finally, he studies concurrent records of the daughters and dams. These last two help to detect early or late maturity, and help bring out differences in environment and management from year to year. Facts for these studies are gathered right at the farm and, while at the farm, he is constantly on the alert for information which will make our knowledge of the animal complete. Herd health and management practices, for example, are investigated as thoroughly as possible.

With these studies in hand, NYABC Manager Maurice W. Johnson and the chairman of the breed committee concerned make a personal inspection of the bull and his daughters before a decision is made about the purchase. Here are some of the points that we consider before making this decision. . . .

New York State dairymen who use the NYABC service depend on their milk checks for their living. Therefore, our first consideration is the level of milk production of the daughters of the sire. We like to get sires whose daughters average over 400 pounds of fat under normal farm conditions.

The type classification programs of the dairy breed associations have definitely shown that good dairy type is closely correlated with high production. Therefore, we visit the farm to look at the type of the daughters with emphasis on good conformation, size and scale, dairy character, and well-attached, evenly-quartered udders. We also like to look over the heifers and calves sired by the bull to get an idea

as to how the progeny look at different ages.

Only by this visit to the farm can we find out what the herd management and feeding practices are, so we can estimate what effect they have had on records. Also, during our farm visit, we get an idea of what the bull's rate of conception is in natural service. And one final point—we want to see what the bull himself looks like. Thousands of people visit the NYABC headquarters on the Judd Falls Road in Ithaca every year, and we feel that bulls of good type are a good advertisement for our breeding program.

Finally, a thorough check is made to be absolutely sure that the bull is in the best of health and free from the contagious diseases found in cattle.

All of these—research, studies and farm visits provide the background for a decision. Then comes the greatest problem of all—the weighing of the various factors—production of the daughters, conditions under which the daughters of a bull were fed and managed, pedigree, health, and individuality of the bull. These must be carefully considered before a decision is made. The bulls which you see at the Co-op are only the choice few of the great number considered each year by the NYABC sire committees!

It is encouraging to know that our members are breeding more and more cows every year to NYABC sires. This fiscal year, we'll top the 200,000 mark in the number of first services—a far cry from the approximately 3,000 bred in 1940. While we're looking constantly for better ways to select sires, we'll rest our case on the members' acceptance, and the average increase in production levels of herds using NYABC service. Personally, I know that the job of sire selection has been a great experience.

Electric Barn Cleaners

Condensed from The Rural New-Yorker

W. Floyd Keepers

THE trend toward barn cleaners is growing rapidly. In many cases where there is doubt in the operator's mind about the advantages to be derived from this equipment, it has been found that lack of sufficient knowledge about barn cleaners has been one of the principal reasons for indecision.

The practical report, here presented, is intended to clarify these

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doubts so that a dairyman can resolve in his own mind, based on the available data, whether the electric-powered barn cleaner is the type of equipment that would fit into his type of operation.

Probably the first cleaner to be offered commercially was the straight pull-out type for cleaning a single gutter. This has two chains with cross flights of wood or steel attached to the chains. The pull-out reel and loading chute are at the end of the gutter outside of the barn. The manure conveyor winds on a drum and is returned to the barn with a small winch arrangement.

Several of these cleaners are operated with some version of hay hoisting equipment. The continuous chain-type cleaner, which travels through both gutters by way of cross gutters at the end of the barn, is widely used. In some cleaners the gutter chain is driven by one motor and the elevator by a second motor. In others, one motor drives the entire mechanism since the gutter chain continues up an inclined elevator, dumps the manure into the spreader, and returns to the barn. This type eliminates the pit.

Another widely used type is the shuttle stroke rod-cleaner which operates in one gutter. The flights are hinged on to a square pipe. On the forward stroke the scrapers swing across the gutter and sweep the manure ahead toward a separate elevator. On the backstroke, the scraper folds against the rod and moves back until the forward motion again swings it out. By proper spacing, these scrapers continue to move the manure forward in the gutter. With the elevator crosswise of the barn, the manure from two gutters is handled by a single elevator or dumped directly into the spreader from the gutter where outside grade conditions permit.

In addition to these most widely used types, there is the belt type cleaner which uses a special type of rubber belt in the gutter. This operates much the same as the pull-out type, with the belt winding on a reel and a return winch to pull it back. It has only recently been commercially available. Another new type is the power shovel which must be manoperated. It operates by a winch that pulls it forward with the droppings from four to six cows at a time and dumps this in an elevator; the power then cuts off and the shovel is pulled back by hand to take a new load. One cleaner takes the manure out with a screw-conveyor in the gutter. This needs to be covered with a grate to keep cows from stepping on it. A new manufacturer in the field uses a link-chain type of belt in the gutter. In addition to these more permanent types, there have been some portable cleaners made. A recent announcement is one of

a garden tractor with a specially devised blade for pushing out the manure.

The selection of the type of cleaner a farmer buys is an individual problem. All of these various types are in operation and most of them are working satisfactorily.

Experience has already righted many of the early mistakes in manufacture and installation and today the barn cleaner is a practical labor-saving machine. Barn cleaners are used on more days of the year than most equipment and they do the dirtiest and hardest job on the farm, that of cleaning out the manure.

The true test of any equipment is in the hands of the users. In order to get the real practical values of barn cleaners, a questionnaire was recently sent out to several hundred barn cleaner users. Of the 650 completed questionnaires, received from owners of herds ranging from 10 to 100 cows kept in stalls, 96.92 percent considered the barn cleaner a good investment. Of 594 replies to that question, only seven stated definitely that they did not so believe; 11 had some reservations. In addition to their own liking for the cleaner, 95.42 percent were willing to recommend it to their neighbors. Only 10 stated that they did not recommend it; 16 did so with reservations, usually based on size of herd, labor supply, etc.

Under present conditions, availability of labor is becoming a serious and limiting factor in dairying. As the supply dwindles, the need for laborsaving equipment will increase. Of 426 who replied to the query whether the barn cleaner saved labor, 272 (63.8 per cent) stated that it did; 69 per cent of those who hire labor stated that a barn cleaner induced a better choice of men.

The barn cleaner not only saves labor, it saves time too. On the average the questionnaire shows that it took 54.2 minutes to clean the barns before barn cleaners were installed; with the cleaners it takes only 13.2 minutes—a saving of 41 minutes a day, actually 51 minutes if the dairyman goes about his other work while the cleaner does the job. Spread that over the entire period that cows are stabled, and it amounts to a lot of man-days. The range of time used in cleaning the barn, prior to the use of the cleaner, ran from a low of 20 minutes to a high of three hours. With the barn cleaner, the low reported was five minutes, and the high 35 minutes.

In an attempt to determine how frequently dairymen used their barn cleaners, it was found that 35 per cent clean twice daily, as against only 28 per cent who cleaned twice daily before installing the cleaner. This is a factor in improved sanitary and quality

milk production.

The problem of securing an adequate supply of bedding is frequently a trying one. Is the barn cleaner a cost factor in bedding requirements? Apparently it is not, since 42 farmers reported that they used less bedding and 50 said more; 472 reported using about the same amount regardless of the kind and cost of bedding in use.

When barn cleaners were first presented, some of the health inspectors looked at them with a questionable eye. Apparently that attitude has changed. Today most health inspectors admit that a farmer is able to keep his barn in better condition than he did before installing the equipment. Of 529 who answered the question, it was found that 382 produced Grade A milk and only 147 did not; 365 stated that it was easier to meet health requirements with the barn cleaner than without it; 112 stated that they had been able to reduce the bacteria content of their milk and credited the improvement to better barn sanitation.

A great many old barns are being remodeled for dairy cows. Emphasis is placed on providing wider stalls and longer platforms for the safety and comfort of the cows. Through the use of barn cleaners, the center alley through these barns is reduced in width to allow for the longer platforms, and the saving in building costs may exceed the cost of cleaner installations.

Caged Layers For The South

Condensed from Poultry Tribune

Milton R. Dunk

RAISING HENS in single-deck cages looks like a coming thing in the South—particularly in Alabama, Georgia, and Florida. That's what D. F. King, head of the poultry department, Alabama Polytechnic Institute, told me when I visited with him at Auburn.

King doesn't see any reason why caged layers should be limited to the South. He looks for the system to be adapted eventually to midwestern conditions.

"Why raise birds in cages?" I asked. "Aren't conventional methods of raising layers good enough?"

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King said that profits per cage are high. Results at the Alabama Agricultural Experiment Station point out that a production of 220 to 240 eggs per cage in a year is possible. At present feed, poultry, and egg prices, this amounts to a yearly labor income of $4 to $5 a cage. Producing 20 dozen eggs from 100 pounds of feed is being done under this system of management.

Additional advantages of this system were outlined by King. They include the following:

1. No dirty eggs, no egg eating hens, and very few broken eggs.
2. Very few broody hens, even when heavy breeds are used.
3. No roundworms, tapeworms, lice, mites, or coccidiosis losses.
4. A uniform supply of fresh eggs at all seasons of the year.
5. A minimum of labor in cleaning houses.
6. No cannibalism, pick-outs, or cowardly hens.
7. An accurate egg record on each hen makes culling easy.
8. The system is as efficient on a small scale as it is for large operators.
9. A uniform labor load throughout the year.
10. Mortality of chicks, pullets, and hens is very low.

The big disadvantage of caged layers is the heavy investment for each hen in equipment and buildings. The cost for stock, equipment, and housing under Alabama conditions amounts to $5 a bird. Egg production begins to fall off slightly when the temperature drops below 40 degrees F., but not greatly until 15 degrees F. is reached. This limits the system to areas of warm climates when no houses are used. Housing costs would make the system more costly in areas where winter temperatures go below 30 degrees F.

While poultrymen on the West Coast have been using cage operations for many years, Alabama is the first experiment station to conduct research work on raising chickens in cages. The Alabama station started their work more than two years ago, and have used more than 2,000 birds in cage system research. King has spent more than four years doing cage system research work at his home.

Two simple houses, 20 x 130 ft., are used. Both of the houses are laid out the same. Poultrymen can use the same style of house and plan of operation as is used at the Alabama station.

One room of the house is large enough for 600 single-deck laying cages (one bird to a cage). The other room, 20 x 20 ft., is used for growing replacements.

The cages are suspended from the ceiling of the house by wires. They are arranged for maximum feeding and egg gathering efficiency. The hens have laying mash before them at all times.

The hoppers are large enough so that mash needs to be fed only twice a week. Oyster shell and grit are fed once each week. Grain is fed in limited amounts late each afternoon on top of the mash. The hens get fresh water at all times from automatic cup valves. One valve serves four hens.

As the eggs are laid, they roll out of the cage into a basket located in front of the cage. A hen remains in the cage as long as she lays at least seven eggs every 14 days. After checking records, the Alabama station is of the opinion that it would be better to use 10 eggs in the last 20 days as a culling guide. Sometimes a hen will take a two or three day rest period, and then come back into production again.

The heavy, continuous culling of hens makes it essential to grow many pullets for replacement stock. On the first of each month, 150 straight-run chicks are started in a five-deck starting battery. After remaining in this starting battery for one month, the chicks are moved to a four-deck intermediate battery. Here they are kept for one month, and then moved into home-made growing pens.

The cockerels are separated from pullets at 10 weeks of age. At 12 weeks of age, the cockerels are sold.

The pullets start laying at five months of age, and are ready for the laying cages. About 10 percent of the birds in the cages are replaced each month.

The labor requirement for handling 600 caged layers and growing replacements is about five hours a day for one man.

Operators of this system can realize about 50 percent more income from meat by dressing both cull hens and fryers, packaging them attractively, and having a uniform supply throughout the year.

The Alabama station is trying to find the answer on how wide the cages should be. They are using 12, 10, and 8 inch cages. About 17 percent more birds can be housed when 8 inch cages are used.

It doesn't seem to make much difference what breed is used as far as profit is concerned. Pullets raised on range have more vigor and stamina when placed in cages than those raised in confinement.

This Alabama system of raising broilers and pullets, and keeping caged layers, can be used by the back-yard poultryman or by a commercial producer.

The Ancients Too

Condensed from Extension Service Review

A 3,700-year-old farm bulletin, the earliest detailed account of agricultural techniques and extension teaching, has been discovered in the archaeological finds of the 1950 joint exposition to Nippur, Iraq, sponsored by the University of Chicago Oriental Institute and the University Museum of the University of Pennsylvania.

This document antedates by more than a thousand years the first previously known agricultural bulletins, Works and Days, by the Greek poet Hesiod, and the famous Georgics by the Roman poet Virgil, states Donald E. McCown, field director of the expedition and University of Chicago associate professor of archaeology.

Among the approved practices listed are putting the seed in two fingers deep and irrigating a fourth time to net an extra yield of one cup in every ten.

Instructions are ascribed to the god of the farmers, Ninurta, to whom praise is given in the poem.

The Sumerians, who developed the first civilization which arose in Mesopotamia in the fourth millenium B.C., were principally an agricultural people with their religious capital at Nippur, 100 miles south of the modern Baghdad. At Nippur, a 108-acre site, the university archaeologists uncovered 5 temples to Ninurta's father, Enlil, chief god of the Sumerians, and the quarters of the Sumerian scribes.

Preliminary translation of the agricultural bulletin, which was found in the scribes quarters, has been made by three of the dozen scholars in the world who can read the oldest-known form of writing, Sumerian: Samuel Noah Kramer, University of Pennsylvania Museum, and Benn Landsberger and Thorkild Jacobsen, of the Oriental Institute of the University of Chicago.

The instructions in the new documents guide the farmer through the sowing and to the beginning of the harvest. The sowing, according to the translation, is to be done with a seeder, a plow with an attachment which carried the seed from a container through a narrow funnel down into the furrow. When desired, the flow of a seed could be regulated by means of a choke mechanism.

The farmer who operated the seeder was instructed to plow eight furrows to each strip of 19½ feet. He was cautioned to place the seed at an even depth in the line, "Keep

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an eye on the man who puts in the seed, have him put the seed in two fingers deep uniformly."

If the seed does not penetrate properly into the earth, farmers were advised to change the plowshare of the seeder.

Four types of furrows were explained, with advice on when to use one type in preference to the others. After the sowing was over, farmers were told to gather all clods so they would not impede the sprouting of the grain.

"On the day when the seed breaks through (the surface of) the ground," the farmer was advised to say a prayer to the goddess of the mongoose, enemy of the field mice and other vermin that might harm the grain. He must also scare away the birds.

It was time to irrigate, according to the bulletin, when the grain had grown so that it filled the narrow bottom of the furrows. The second irrigation was to take place when the grain was dense enough to cover the field like a green carpet, literally "like a mat."

If a reddening appeared in the grain, the farm god explained that the crop was being damaged by the dread samanu disease. He advised discontinuation of irrigation.

Irrigating a fourth time would net an extra yield of one "cup" in every 10.

The farmers were also advised to watch that the grain when ready for harvesting, did not bend under its own weight. "Cut it at the right moment," the text admonished.

The text of the newly discovered clay tablet closed with the above line. Other tablets and fragments, closing with a line of praise for Ninurta, continue to give detailed instruction about harvesting, threshing, and winnowing.

The joint expedition of the two universities sent out in 1948 and 1950, and scheduled again for 1952, was the first major postwar archaeological expedition to the Near East. It was preceded more than a half centry ago by an expedition of the University of Pennsylvania.

Findings, already announced from the expedition, include the tracing of the 1,600 years in the history of the temple of Enlil, the oldest-known record of successful prosecution for murder, a hymn to the oldest-known goddess of justice interested in social and moral welfare, Nanshe, and jewelry and pottery from 2,000 to 500 B. C.

A $20 Million Microbe Hunt

Condensed from New Jersey Farm and Garden

Dr. William H. Martin
Rutgers University

How a microscopic organism found in the throat of a chicken led to a vast medical enterprise with a capital investment of more than $20 million and an annual output of more than $100 million is one of the absorbing stories of research at Rutgers University.

This organism is the one that produces streptomycin, a drug discovered by Dr. Selman A. Waksman and his associates in a tiny laboratory at the Station eight years ago.

Since then streptomycin has saved the lives of hundreds of persons who would otherwise have succumbed to certain forms of tuberculosis and other diseases which the new drug is able to combat.

Dr. Waksman and his Department of Microbiology are now in more spacious quarters in a new building—Lipman Hall. The building was named after the late Dr. Jacob G. Lipman who was director of the Experiment Station from 1911 until his death in 1939.

It was just a half century ago that Dr. Lipman joined the staff of the newly-organized Department of Soil Chemistry and Bacteriology, first of its kind in the United States.

At that time little was known of what goes on beneath the surface of the soil. The countless billions of microscopic forms of life such as the bacteria, fungi, actinomycetes and protozoa that inhabit the soil and perform vital functions there, were strangers to the scientists.

Lipman and his associates began to probe into the secrets of these tiny organisms. In 1917 Dr. Waksman, who had graduated from Rutgers in 1915 and who had just gained his doctorate at the University of California, was appointed microbiologist of the Station and lecturer in soil microbiology.

Through the years these scientists pioneered the exploring of the mysteries of the soil microbes. They gained international fame for their leadership in this field and they gave agriculturists a new insight into how these microorganisms affect the fertility of the soil, what happens to humus ma-

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Sea Isle City, New Jersey, June 1951

terial in the soil, and how some help plant roots manufacture the growth-producing substance known as nitrogen, while others cause iron pipes to corrode.

It was back in 1915 that they started to study a family of microbes known as actinomycetes. At that time hardly a half dozen persons in the world even knew about these organisms, much less cared about them. They were generally regarded as having little practical importance, except as causative agents of certain obscure human and animal diseases and of potato scab.

And yet it was from this basic work on actinomycetes done at the New Jersey Station that streptomycin came. Streptomycin was followed in rapid succession by other actinomycete-produced antibiotics, including chloromycetin, terramycin and neomycin. Three of these were produced at other laboratories but all discoveries were facilitated by the original work done at Rutgers.

Royalties from the manufacture of streptomycin are to be used to finance construction of a $2 million building which will house a new Institute of Microbiology.

It is expected that this Institute will help our State University to continue its world leadership in the field of soil microbiology.

Of immediate interest to the public is the search now underway in the Department of Microbiology for antibiotics effective against virus diseases. Viruses are the smallest living organisms, most of which are invisible under ordinary microscopes. They cause many serious diseases for which there have been no adequate drugs for treatment. Among the infections produced by the viruses and related organisms are Rocky Mountain spotted fever, typhus, influenza, mumps, yellow fever, and most important of all—the common cold and polio.

If the New Jersey Experiment Station can lead the way toward the development of drugs which can cure these diseases, the benefit to mankind will be immeasurable.

Humus-Rich Soils Form Honeycomb Ice

Condensed from The Organic Farmer

ALL soils do not form the same kind of ice when they freeze.

Soil rich in organic matter forms porous, honeycomb ice that soaks up runoff water and prevents erosion. Worn out, hard soils freeze into rock-like ice that penetrates deeper and thaws later in the spring.

These startling facts were brought out in a paper entitled *Vegetation and Frozen Soils* recently presented to the American Geophysical Union by Leon Lassen and E. N. Munns.

Practical applications of this soil-ice study are important and far reaching. The facts turned up may even throw light on the origin of spring floods that cause vast losses to farmers every year. Such floods may be controlled if some way can be found to govern the type of ice that forms on farmer's fields.

Many frozen soil investigations were made in New England during the winter of 1946 by Lassen and a colleague. The impervious, concrete type of ice was found in fields that had been cultivated and were low in organic matter. Spongy ice was found in meadows and fields which had a higher humus content.

Traditional opinions regarding frozen soil are being proved false by these studies. It is not true that all frozen soil will not soak up water or that all soils freeze or thaw at the same time. Fertile fields and woodlands may be free of ice at the same time that poor land is frozen solid and is repelling potential flood waters.

The fact that soil under light grass does not freeze as readily as bare soil was proved by Henry W. Anderson in 1947.

But most important is the *type* of ice that forms in cold weather. Concrete ice that forms on poor soil is a very real flood menace. Honeycomb ice, on the other hand, causes no trouble to farmers.

Soil and water authorities have in the past stressed the relationship between the falling organic matter content of U. S. soils (four to 1.5 per cent in 200 years) and increasing flood damage. There is little doubt that farmers, who suffer most from floods, can stop rampaging waters before they start.

Putting more organic matter into the soil and grasses on top of it is the way to do it.

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Emmaus, Pennsylvania

Self-Help and Point Four

Condensed from Foreign Agriculture

Dr. Arthur F. Raper, Social Scientist
Bureau of Agricultural Economics

To work effectively with the peoples of the Near East and Southeast Asia, we Americans—whether technician or otherwise—will need to understand and appreciate the many contributions that have come to us from them. This is the starting point for us if we seriously want to help them help themselves through the wider use of improved farming practices.

The giving of self-help is not an easy matter, for it involves acceptance on the part of the people of the other country as well as the offer of practical assistance on our part. Recent developments show how food production can be appreciably increased through science; but we must remember that most of the people in the Near East and Southeast Asia still assume that it is virtually impossible to increase food production. It will help if we will remember how new our own understanding is in this matter. Quite naturally, people who have for a long time been accustomed to crowded living conditions, low yields, and to religious and philosophic systems which serve to make life bearable under these conditions, often look upon change with misgivings. Their greatest fear is that things will get worse, and to them "change" often suggests just that possibility. Therefore, thorough consideration must be given to cultural and psychological factors. The twelve points below may prove helpful.

1. Find a community of feeling. Finding a community of feeling can perhaps best be done in such universal fields as those of food, shelter, clothing, taxes, debts, worship, raising of children, and the like. It will be well to let the people know that we appreciate the contribution which they have made in such realms as architecture, music, government, or other basic areas of our everyday living. Also, it will usually be easy enough to recognize the presence in our country of agricultural products which originated in the areas under consideration. Maybe one of our leading cereals or fruits or farmyard animals or fowls originated there. It does not make a great

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deal of difference what the community of feeling centers around, but it does matter tremendously that a community of feeling be found.

2. Start where the people are. Starting where people are is, of course, a well-established teaching principle among us already; in dealing with under-developed areas, it is necessary that special attention be given to such matters as the present level of technology, the type of transportation and communication facilities that are available, the degree of literacy in the country, and the main religious practices, family systems, and food habits. There are two other things we need to keep in mind if we are to start where they are: (1) the people live in villages, rather than in dispersed farmsteads as in the United States, and (2) nearly everywhere there are evidences of increasing interest among the people themselves as a national group. This has in recent years expressed itself widely in terms of the emergence of new nations (for instance, Pakistan, India, Burma, Indonesia, the Philippines, to name only those in Southeast Asia). This rising interest in nationalism may afford us a good opportunity to identify our country with theirs, for less than 200 years ago our own country became an independent nation. A day two hundred years ago seems far away to us, but to most of the people in the Near East and Southeast Asia, it is looked upon as a rather recent date.

3. Try to understand why they do things the way they do. There are numerous ready opportunities for us to appreciate different ways of doing things. Some of this understanding comes to us by way of our appreciation of Biblical conditions, while others will be more convincing on a common-sense basis. In fact, many of the present practices are akin to the way our own great grandparents lived as pioneers in this country or, still a little earlier, in Europe. For us to function effectively at this point, we will often need to use our imaginations. Take, for example, the matter of harvesters leaving heads for the gleaners. Upon analysis, this practice is a sort of elemental social security formula; it affords poor families a recognized way to secure food. The family shrine of theirs is not wholly foreign to our way of thinking, for the sacredness that centers around our hearth, as a symbol of home, centers around their family shrine. The fact that portions of rice are often offered in the local temple and also at the family shrine is less easy for us to comprehend, although not wholly outside our understanding, particularly some of our religious backgrounds, such as the oft-heard story of the offering of the

lamb without blemish, or of a yet more modern symbol, the giving of ourselves to important tasks. In a community where there are more people than there is food, rice offered in the temple or the family shrine is in essence an offering of themselves.

It is also important, if we are to understand why they do things as they do, to realize that the whole outlook of the village dweller is very different from that of the person who lives on an American farmstead. The village dweller is not primarily an individual, but rather a member of a group. It seldom crosses the villager's mind to go to live on under-developed land by himself, or even with his family. This constitutes a real problem, for there is additional land that could be cultivated in parts of Southeast Asia. Also, it should be remembered that the structure of the family in these areas is basically different from that of our own, for whereas ours is limited primarily to that of a single generation (father, mother, and children) the family there is more inclusive, contains grandparents and elderly kinsmen, and is usually highly stable; in many areas, the older a person becomes the greater is his status.

4. Carry on activities in which the people themselves are interested. It is our impression that we need to spend more time finding out, what the people want for themselves, and less time deciding among ourselves what we think they need. If this basic principle is adhered to, there is little likelihood that we will fail in our desires, for our technical self-help services will be wanted by them. This point in a way summarizes most of what has been mentioned in the three earlier points.

Usually, the activities in which the villagers are interested will be concrete, such as control of pests that injure crops or animals. It appears that the rinderpest control program, for example, in Thailand and Burma has received enthusiastic local support; the reason is a simple one: farmers rely upon water buffaloes and bullocks for draft power, and the prevention of the death of their animal is appreciated by the farm family. Equally concrete is the control of insects in rice and other crops. Seed selection, too, will likely rate high, because villagers prefer rust-free and smut-free varieties. Within the range of seed selection is the matter of securing uniform maturation through selection; at present some of the rice stalks get ripe well ahead of others, interfering with effective harvesting. There might be local interest, too, in a better method of planting the seeds. This is a need in the Near East.

Conservation of water is of interest, especially in the dry portions of the Near East. Also, it

would likely be easy to arouse widespread interest in improving threshing practices, such as the small footpedal threshing machines now in general use in Japan and Formosa. Other practical techniques in which interest might be expected are grain storage facilities which keep out the rats, and cleaning practices which remove the sand and other foreign matter. Fertilization practices could become areas of interest, for now practically nowhere in the Near East and Southeast Asia is effective use being made of either compost or commercial fertilizer. Practices already well established in Japan and Formosa seem to offer much promise.

5. Help the people believe they can improve their situation. This point, like the first one, will perhaps best be centered on very elemental human desires, such as helping villagers believe that a larger percentage of the children can escape death in infancy. There will probably be interest, too, in the possibility that the amount of hard manual work in rice paddy farming can be lessened. It needs to be remembered always that there will be little incentive on the part of the village people to apply themselves to their problems unless they come to believe that they can improve their situation. That is why the initial performance had best be centered upon very elemental human situations. Once there is the belief that improvement can be made—and even the most likely areas of life will not be easy—then the way is open for further development. It is well for us to keep in mind that where there is little hope, there is little endeavor. The democratic goal of more self-direction and more responsible participation for the villagers lies ahead only when the villagers have come to see that they can really improve their situation.

6. Be content with small beginnings. The promoters of self-help activities must be prepared for a tardy response from the villagers. Small changes, even after a considerable period of work, should be cherished. The first innovation is the most difficult. Quite naturally, villagers who have lived at the same place and in the same ways for a long time have developed a close-knit culture, which is generally intolerant of change. Folk cultures everywhere are characterized by stability; the simple cultures that were not stable have not survived. Once the first change has been made in a folk culture, other changes can likely be brought about more or less as a matter of course. Since the first change tends to set the direction of later developments, it is of critical importance that the i n i t i a l self-help activities be launched with an understanding

of the likely effects of success of the program upon the culture as a whole. Again, it will be helpful if we will remember a basic fact about our own western civilization: It has been cumulative, and therefore progressive. This needs to be kept in mind, especially by technicians responsible for the promotion of self-help activities in areas where the people have had little belief that progress was possible.

7. Use the villagers' own organizations. We will need to give careful attention to doing things in ways that fit in with the local organizational framework. It takes much less energy to use existing organizations than to set up new ones. Furthermore, when we use existing organizations, the leaders of the cooperating groups serve as sponsors of the activities we are promoting, and so assure local participation. Furthermore, the very genius of self-help lies in utilizing existing physical and social resources, which include established group relationships no less than soil fertility. If the cooperation of local groups and leaders cannot be secured, there is great likelihood that our activity will be faced with organized opposition or at any rate fail to get the endorsements needed to carry on successfuly.

8. Watch the villagers' pace, and keep in step with them. We need to remember how different are our backgrounds and experiences from those of the people with whom we are working. We will need to allow time for questions to be formulated and asked. The villager will take little for granted. Rather he will want to see every step of each activity. In this connection, it will be well for us to remember that the villager knows practically nothing about modern conveniences and the democratic process. It takes time to get things done in our fluid society, and a much longer time among peoples whose way of life has been generally static for centuries.

9. Place responsibility on the villagers as soon as they can take it. The self-help plan operates best when the person being helped knows that he will be given full recognition for any progress he makes. This approach is most important; otherwise the villagers will sense that the program is not designed primarily for them. If the villagers are given all the responsibility they can take, the persons who initiated the project are free to move elsewhere and start anew. Usually, a gradual withdrawal of the initial trained supervisory personnel is desirable. Otherwise, the project may fail for lack of continued application of the basic principles upon which the success of the project rests. It is important that the whole responsibility be left

with the villagers as soon as they can carry on, even though the supervisory personnel may need to return periodically to make certain that everything is moving along as planed.

10. Deal with the villager as an equal. Dealing with the villager as an equal is perhaps the most basic point yet made. It is doubtful whether anything can be done effectively on any other basis. The equalitarian approach, basic in all education, is especially needed when dealing with the villager, for he often looks with suspicion upon the outsider, who is nearly always better dressed than himself. Not only is it good educational procedure to deal with the villager as an equal, but it is the only possible procedure, for unless we consider him an equal and, as such, capable of helping himself, we no longer have any foundation for our selfhelp program. To do otherwise would betray our own values on democracy and fair play and the emphasis we put on the development of independent personalities.

11. Expect growing pains. The villagers themselves, as they begin to have hope, will naturally want to have their own way. We may expect at times to find them somewhat demanding and wanting to assume more responsibility than they are able to carry out. These evidences of growing pains should be greatly welcomed by us, for they, more than anything else, demonstrate that the villagers are beginning to want to do things for themselves. The person who is not prepared to adjust himself to these growing desires of the villagers to help themselves should not have responsibility in promoting self-help programs.

12. Don't expect thanks from the people being helped. In the very nature of the situation, the recipients of assistance are seldom in a position to offer open appreciation. Rather, they are usually aware that they are making headway belatedly and therefore will often be somewhat on the defensive. We should keep this point squarely in mind, lest we feel that we have failed because the villagers do not seem to appreciate what we are doing. In the long run the villagers will be thankful, but usually long after the time when the self-help demonstrations have proved their initial effectiveness. Much of the same type of situation prevails in human relations everywhere, even in our own families—for children usually become grateful for what their parents have done only after they themselves have become parents. A basic understanding of why the villagers will not give immediate thanks for the assistance given them will help the on-the-job promoters of self-help projects through the dynamic, but tedious, period of growing pains.

Finally, it is important that we realize that we defeat our ends of raising the levels of living in retarded areas through peaceful means if our efforts merely increase the unrest among the villagers. It is necessary, therefore, that, wherever we create new desires for goods and services, we at the same time make clear how these new desires can be satisfied. The reasons why some new desires cannot be satisfied immediately must be fully and frankly explained. Promises of later realization of these felt needs must be made with great care, once made, no effort spared to assure their convincing fulfillment. In short, we need to convince the villagers that they can raise their levels of living by concrete projects that we are ready and able to help them begin to put into operation.

Feeds Once a Day, Cows Make 509 Lbs. Fat

Last winter the 20 grade Holstein cows on the Anton Resler and Sons place were fed only in the mornings. Yet they topped the Steele County, Minn., DHIA last year with a 509-pound butterfat average. Here's how the Reslers did it:

They started milking at 5 a.m., and didn't feed a thing until the milking was finished. Then they gave the cows their corn silage, with a grain mixture sprinkled on top.

The cows polished this off while the Reslers were in at breakfast. Then, about mid-morning, they turned the cows out, cleaned the stalls and gutters, bedded the place down, and heaped up good-sized helpings of chopped brome-alfalfa in front of the stanchions. That ended the feeding until next morning.

What do the Reslers think about this feeding system?

"We're all for it," says Anton Resler, a GI on-the-farm training instructor. "It saves us work, of course; and the cows seem more contented. While we can't say that it alone has helped our herd average, we can't see that it has harmed our production, which jumped from 432 pounds fat a year ago to the present 509."

—Farm Journal

Leg Weakness in Turkeys Can Be Prevented

Condensed from Farm Research

M. L. Scott

THE use of fish liver oil in turkey starting rations markedly aggravates the incidence of a leg weakness in young turkeys, which results primarily from the lack of an unknown nutrient in the diet. Recent experiments conducted at Ithaca have proved this.

This discovery provides an important clue concerning the nature of a malady that has plagued turkey growers for a number of years. This disease, which has been prevalent to a variable extent on turkey farms in all parts of the country, usually strikes the largest male turkeys just when they are being readied for market and, therefore, causes severe economic losses each year. The condition, which does not seem to be identical with perosis, is characterized by an enlargement of the tibiometatarsal joint (hock) at approximately two weeks of age. This usually returns to normal at approximately 4 weeks of age, only to recur in more severe form as the turkey reaches 14 to 16 weeks of age.

The discovery that the malady is aggravated by the feeding of fish liver oil, together with earlier findings that turkey poults suffering from enlarged hocks show an abnormally high excretion of an essential muscle component, *creatine,* strongly indicates that the leg weakness is the counterpart in turkeys of encephalomalacia (crazy chick disease) in chicks and of muscular dystrophy (muscle degeneration) in rabbits and guinea pigs. Indeed, the disorder in turkeys appears to be a form of nutritional muscular dystrophy.

Vitamin E, usually the primary deficiency in cases of encephalomalacia in chicks and muscular dystrophy in mammals, has little or no effect upon the enlarged hock disorder in turkeys. On the other hand, dried brewers' yeast has been found very effective in preventing this disorder even in the presence of fish liver oil.

Four difierent experments with various levels of fish liver oil (vitamin A and D feeding oil) showed that the incidence and severity of enlarged hocks bore a direct relationship to the amount of fish liver oil added to the basal diet. Without fish liver oil in the diet, very few or none of the poults showed the disorder. As the level

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of fish liver oil was gradually increased to 4 per cent, the incidence of enlarged hocks progressively increased until 70 per cent of the poults suffered from the condition.

Other experiments indicated that fish liver oil may aggravate the disorder by altering the growth of certain intestinal microorganisms which are ordinarily capable of synthesizing an unknown nutrient required for prevention of the disorder. Other substances known to alter the growth of intestinal bacteria have been found to have a marked effect upon the occurrence of leg weakness in turkeys. The feeding of diets high in lactose or in inorganic salts, both of which favor an acidophylic intestinal microflora, increase the incidence of enlarged hocks and leg weakness in turkeys. On the other hand, supplementing the diet with inositol and para-aminobenzoic acid markedly reduced the occurrence of leg weakness. However, inositol and para-aminobenzoic acid were ineffective in preventing the condition when supplied together with an antibiotic (aureomycin). Therefore, these results indicate that the beneficial effect produced by these substances was due to stimulation of certain intestinal microorganisms to synthesize an unknown required factor. Should this prove to be true, it would explain why the enlarged hock disorder has occurred in such a sporadic manner on turkey farms throughout the nation, since relatively small changes in diet or environmental conditions often produce marked changes in the type of intestinal flora.

A number of experiments have been conducted in a search for sources of the required factor. In four of these it was found that the addition of dried brewers' yeast to a diet containing 2 per cent fish liver oil completely prevented the disorder in every instance. Preliminary tests indicate that dehydrated alfalfa and fresh grass juice are also fair sources of the factor.

Several experiments conducted with and without an antibiotic (aureomycin in this case) in the diet indicate that when the diet is deficient in the unknown required factor, the antibiotic causes a more rapid onset of the early symptoms of the enlarged hock disorder. However, as the poults continue to grow, the symptoms disappear more rapidly than they do in poults receiving the same diet without the antibiotic. Preliminary results indicate also that fewer of these poults receiving the antibiotic show a recurrence of the disorder at 16 weeks of age. When dried brewers' yeast was present at 5 per cent of the diet, no cases of the disorder occurred whether or not the antibiotic was used.

These results serve to emphasize that in the formulation of turkey

rations attention must be given not only to the nutrients required for optimum growth but also to the factors necessary for prevention of the enlarged hock disorder.

Vitamin A should be supplied either as carotene from corn products and green leafy materials or as a very high potency vitamin A oil so that the amount of fish liver oil present in the diet is maintained at a minimum (less than 0.25 per cent of the diet should be a safe level). In addition, until further information is obtained on distribution of the required factor in other natural materials, it is highly desirable that rations for turkeys contain approximately 5 per cent of good quality dried brewers' yeast.

Furthermore, to maintain normal levels of muscle creatine, it is considered advisable to supplement turkey rations with a methyl source in addition to the National Research Council's recommended allowance of choline. The amount of methylating agent required for maximum muscle creatine has not yet been established, but it appears that this requirement should be met by the use of approximately 0.1 per cent additional choline, betaine, or methionine. The results indicate in general that the presence of an antibiotic in the diet has a benefical effect upon the enlarged hock disorder.

Feeding Antibiotics

Condensed from Hog Breeder

T. J. Cunha
Florida Agricultural Experiment Station

FREQUENTLY the statement is heard that all antibiotics act the same and that one can be used in place of the other with comparable results in animal feeding. As a result of those statements an experiment was conducted where we compared aureomycin, streptomycin and penicillin with 30-pound pigs fed a control corn—peanut meal ration to which was added minerals (including trace minerals) and the vitamins which the pig has been shown to need in the ration — thiamine, riboflavin, niacin, pantothenic acid, pyridoxine, chlorine, folic acid and B_{12}.

Four lots of pigs were fed penicillin. These pigs gained no better than the pigs fed the control ration. The pigs fed the control ration gained at a rate of 0.72 pound daily; whereas, the pigs fed streptomycin gained at the rate of 0.91 pound daily. The pigs

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Chicago, Illinois, June 1951

fed aureomycin gained at the rate of 1.63 pounds per day. Thus, the results obtained showed that aureomycin supplementation greatly increased the rate of growth; whereas, streptomycin increased growth slightly and penicillin was of no help in growth.

The above findings are in contrast to check studies conducted by other groups of workers using a corn—soybean meal ration. They found that aureomycin, streptomycin and penicillin all helped about the same in stimulating growth. The above findings indicate that the growth promoting effect of the various antibiotics may vary with the species of animal and the nature of the basal or control ration employed.

Evidently, with the data reported to date, it seems that with a corn—soybean meal ration the effect of antibiotics is different from that obtained on a corn—peanut meal ration. The intestinal flora present in the pig fed a corn—peanut meal ration is evidently such that aureomycin supplementation gives a considerable increase in the performance of the pig. However, that flora is evidently not affected to any extent by penicillin and streptomycin. Although aureomycin gives such a great increase in growth with a corn—peanut meal ration, the effect on growth with a corn—soybean meal ration is not as large. Thus, it seems that the ration fed and its consequent effect on the intestinal flora will have considerable effect upon the beneficial effects to be obtained by antibiotic supplementation. These findings also mean that statements to the effect that any antibiotic can be used, since they all have the same effect, are not correct. While corn—peanut meal rations are not used to any great extent in the feed industry, it still must be remembered that if these differences occurred with a corn—peanut meal ration it is possible that they occur with other rations which deviate from a corn—soybean meal base. It seems that the only way to be sure of the effect of an antibiotic or combinations of antibiotics, is to try them with the ration to be used.

There's Profit in Raising Capons

Condensed from Everybodys Poultry Magazine

Allen P. Grant

THE production of capons has come to the attention of many growers who have been anxious to keep astride of the times. Capons are tops in quality poultry meat and the demand for this delicious bird has far exceeded the supply. Capons have been practically unknown in many markets in the past, but have caught on readily once they have been introduced to the consumer.

The particular advantage which capons hold over other poultry meat is in their flavor. This tender, delicious meat is due, of course, to the operation of removing the testes from the cockerel. Both physical and psychological changes take place in the bird after the operation so that it becomes docile and adds fat to its body and tissues as maturity approaches. This ability to add fat to the tissues is the real secret of the delicious flavor which the capon attains. Interspersed in the tissues, fat adds flavor and tenderizes any fowl or animal meat.

Other advantages which capons have are many and varied. Perhaps the next, from an economical standpoint, is in their size. Capons meet the requirement for a "family size" bird in that they are generally marketed at from 8 to 10 pounds in weight. This is the ideal size for the average family. Capons fit nicely into the present day oven, are large enough to take care of those special meals on Sundays and holidays and are not so large that the family must eat them for a week after.

Our poultry breeders have done excellent work in breeding and crossing so that we can readily find birds today which mature at much earlier ages than formerly. Generally, the crosses have proved most satisfactory for capons as they have the vigor and early maturity that is sometimes lacking in the purebred strains. This, however, is not always a fact, for many of our breeders have developed their pure strains to an extent that they make excellent meat birds. The American breeds and crosses make the most satisfactory capons. These breeds have yellow skins, grow to an economical size, and are generally more readily available than are some of the other breeds. Ply-

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Hanover, Pennsylvania, February 1951

mouth Rocks, Wyandottes, Rhode Island Reds and New Hampshires are all good for capon purposes. The Rock-Red Cross is probably the most popular of all, and it is one which has adapted itself very well when caponized. Having yellow skin and barred feathering, this cross frequently brings more when marketed than do some of the other breeds.

A good, fast growing strain of any of these breeds will be ready for market at six months of age. It is of great importance that attention be given to the ability of the strain selected for good growth characteristics as otherwise four to six weeks longer may be required for mature growth. Assuming that good stock is used, it is possible to have capons mature at an average weight from eight to nine pounds in 24 weeks.

There have been considerable advances made in the feeding of poultry during the last few years, and better feeds and feeding methods have helped in the growing of capons.

The following feeding schedule has proven to be very satisfactory and will provide maximum growth. The birds are fed starting mash for six weeks at which time they are changed to growing mash. At this period a small amount of grain is given the birds each evening and is gradually increased until they are consuming 50 percent grain and 50 percent growing mash at 12 weeks of age. At 12 weeks both grain and mash should be kept in front of the birds at all times, using twice the hopper space for grain as is used for mash. In this way the birds will consume a large amount of hard grains which they can utilize to advantage. This feeding schedule is simple and yet produces the best possible capon. Note should be made that a good growing mash is used and that no fattening mashes or pellets are given in the program. Fattening mashes are not required as the nature of capons is such that they naturally fatten themselves. In fact, any change in feeding during the last four weeks is generally detrimental as it tends to throw the birds off feed with a resultant loss in weight.

Raising capons is simple because they are readily adaptable to a variety of conditions. They are quiet to work with and are not at all particular as to their environment. They may be grown indoors, on range, or on wire. The best method, of course, is on range where they will pick large amounts of grass which will affect somewhat the amount of feed consumed. They are good rangers and will not wander as do turkeys. If they are grown inside they should have four square feet of floor space at maturity. As in

growing other types of poultry, crowding should be avoided and plenty of feeder and water space provided. Handle them as you would your pullets and no mistake can be made.

Perhaps the one thing that has held back capon production as much as any other has been the availability of the caponized birds. There are two general methods of starting a flock. That is, either by caponizing your own cockerels or buying started capons. The first method is frequently followed when the surplus males are used for capons and the pullets are to be grown for layers. This is often an advantage to the small flock owner as it gives him an outlet for the male birds as they can be grown with the pullets without trouble. The cockerels are generally caponized at five to eight weeks of age and information concerning the method may be obtained from the various state colleges or experimental farms. Other advantages of home caponizing are the elimination of shipping the caponized birds, the possible use of specialized breeds for particular purposes and control over the growing of the bird from day old to maturity. Perhaps the biggest disadvantage in home caponizing is in learning to do the operation successfully. Although the operation is not difficult, it does require much practice to become efficient. Many poultrymen employ local caponizers to do the work for them, but in many instances these operators are not skilled enough to do a competent job. When employing a caponizer it is wise to check his work and note that he keeps mortality and the number of slips to a minimum.

During the past few years it has been possible to buy "started capons." These are generally sold by reputable concerns and afford a method of getting into capon production when it is impossible to have the work done locally or by yourself. Generally, the quality of these birds is excellent and breeds are usually offered which prove satisfactory for capon production. It is well to check the breed you are buying, however, as some concerns use their "started capon" business solely as an outlet for surplus cockerels. It is wise to buy from a concern which specializes in this business and guarantees you quality birds of a specified breed. Generally the number of slips will be considerably less when purchased from these specialized concerns as their operators will have had experience on thousands of birds. In buying your capons "started" it is also possible to get them during the year when they will fit into your poultry program.

There is good demand for capons all during the year, but the

most activity is generally between November and the following Easter. Holiday markets like Thanksgiving, Christmas, New Year's Day and the Jewish holidays tend to stimulate the demand for capons as is the case with roosters and turkeys. The top market of the year is at Easter, and this is generally the high for the live market. Relatively few capons are available at this time as most poultrymen do not grow them during the winter. It is a market that should be investigated by more poultrymen as capons are so easy to handle and could prove to be a profitable venture during the winter months. Capons may be grown in outdoor shelters in many sections throughout the winter. Where there is a fairly open winter, capons will carry through in shelters if given protection from the wind. This possibility should be considered by more poultrymen as it often affords year around use of much idle equipment. Other markets for capons include those such as retail egg routes, stores, hotels and restaurants. An especially good marketing method is by eviscerating and freezing when the equipment is available for this process. Commercial growers generally sell them alive and do a good repeat business. There are not enough capons to satisfy the requirements. Only three-fourths of one percent of the poultry handled in New York City markets last year were capons; a small amount for this highest quality poultry product.

Capon production is well worth the attention of more poultrymen. Not only does it afford the utilization of poultry throughout the year, but it will give a side income that would otherwise be lost. In many instances capons are the main source of income where commercial growers are raising them in large quantities. It is doubtful if any other poultry project will show as high a labor income as do capons.

Calves Get Worms From Sheep and Cows

It can be dangerous to keep your young calves on sheep or cow pasture. They can pick up tapeworms that will either set them back seriously; or kill them, if they get a bad case.

Sheep, in particular, are often troubled with tapeworms. Cows can have them, too. If you suspect tapeworms in your cattle or sheep, it's good business to treat them, and keep your young calves on clean pasture.

—Farm Journal

Healthy Ranges Resist Halogeton

Condensed from the Utah Farmer

George Stewart
U. S. Forest Service, Ogden, Utah

REPORTS of the spread of the new poisonous annual weed, halogeton (Halogeton glomeratus), and recent publicity about its deadly effect on sheep have alarmed many of Utah's farmers and stockmen.

This alarm is justifiable, because the weed can be a killer, but it should lead to effective action against the pest rather than to unreasoned attempts to eliminate it immediately. By its very nature, for example, its huge production and efficient dispersal of seed, halogeton will put up a stubborn fight against the control measures. Our attack should therefore be based on a thorough understanding of how the plant behaves and its weaknesses, if any. Our most important natural defense, a good cover of perennial grasses and forage shrubs, should be built up and maintained.

Halogeton was first collected from the vicinity of Wells, Nevada, in 1935. It had been there for sometime before but no one knows how long. It was not at first known to be poisonous; its highly toxic properties came to attention later.

In the 15 years since its first collection halogeton has spread from a small area near Wells to much of northeastern Nevada and into adjacent parts of Idaho, Utah and Wyoming. It occurs as a major infestation in Elko county, Nevada; the Raft River valley in the general vicinity of Malta, Idaho, and in western Boxelder and Tooele counties, Utah. Since the seeds are readily distributed by wind, being carried in the wool or hair of animals, and in mud on the wheels of automobiles, they are spread quickly and widely. All stands so far observed are in places where tillage, roadside maintenance, or very severe grazing use has damaged the natural plant cover.

Numerous cases observed in Boxelder county, Utah and Cassia county, Idaho, show that plowed fields without a crop and roadsides or fence lines stripped of old cover are fully occupied by halogeton. A few feet away in good stands of sagebrush or shadscale, especially if there is some perennial grass, there is no halogeton

Reprinted by permission from the Utah Farmer
Salt Lake City, Utah, January 4, 1951

or only a few scattered plants with meager growth. Unfortunately, there are vast range areas on which the plant cover has been so injured as to permit halogeton to find space between the native plants in small spots of a few square feet to a few square rods.

Halogeton is a near relative of Russian thistle and so far as can be observed it behaves almost like a twin. For this reason, the responses of Russian thistle provide valuable information on the way halogeton reacts in growth and to control measures.

Russian thistle occupies areas where the natural plant cover has been disturbed and opened by the killing or weakening of the native plants. When the native plants are built up in vigor or in numbers by conservative grazing, Russian thistle decreases in about the same proportion as the natural cover is improved. At the Desert experimental range, in southwestern Millard county, Utah, moderate grazing for a few years practically eliminated Russian thistle whereas it continued to be prevalent on severely grazed range.

When an area occupied with Russian thistle is seeded to crested wheatgrass, the grass in the second and third year ousts the Russian thistle. In the first year the small grass plants do not use the soil moisture completely enough to destroy Russian thistle by competition. But as the grass plants develop their roots, Russian thistle seedlings die and the plants disappear from the stand except in such spots as may have failed to get a stand of grass. In this respect halogeton is exactly like Russian thistle, as we know from grass plantings in extensive areas of halogeton.

Near Wells, Nevada, in 1945, a fire ran out of control and burned over 16,000 acres of foothill and valley land. The forest service seeded part of the burned-over land, amounting to only a few hundred acres as most of the area was in private ownership or on bureau of land management land. A good stand of crested wheatgrass was obtained. Next year most of the remainder of the burned-over valley land was occupied by halogeton. Only a few halogeton plants appeared in the drill rows of grass and these were incidental plants much dwarfed by competition of the grass. In the second and subsequent years only well-developed crested wheatgrass plants could be found in the drill rows. The halogeton was either entirely lacking or occurred as infrequent and much dwarfed specimens, insignificant from the standpoint of being able to cause injury.

More recently several block seedings of crested wheatgrass were made within the burned areas and still more recently some

sizable plantings. It is clear now that what had been expected is definitely true: when a good stand of grass completely occupies the site halogeton cannot invade the area. At first a few plants may find openings in which to start while the grass is young and its root system not fully developed. However, any spots larger than a square yard where there is no grass will probably afford a place where halogeton plants can survive.

Where grass planting is done to aid in the control of halogeton the job must be done with the care required to give reasonable assurance of getting stands of grass. One large planting in Idaho made for the purpose of controlling halogeton failed to produce an adequate stand of grass over large parts of the area. A cursory examination afterward indicated that seed had been drilled three or more inches deep. This is far too deep for crested wheatgrass seedlings to emerge. Everybody will have to remember that it is the roots of growing grass plants and other perennials that take away soil moisture from halogeton and prevent it from occupying the area. The mere act of preparing a site for seeding may further open the plant cover and make conditions more favorable for the establishment of halogeton.

So far as our present knowledge goes, grass establishment cannot be depended on where the precipitation is less than 9 or 10 inches or where the soil is excessively high in its salt content. For conditions more favorable than these the species of grass needs to be a suitable one and seeded by recommended methods on land properly prepared.

Proposals to fight halogeton in major infestations by means of burning, clean tillage, or spraying with 2,4-D have not yet been clearly thought out. Reseeding should be part of such treatments in areas where grass can be expected to take hold. In areas too dry or on soils too salt laden for grass seeding all three control measures might be dangerous. Interspersed perennials might be killed instead of strengthened and more room made for halogeton the following year. On the other hand, new small infestations far from major areas of halogeton should be fought by every known means.

It seems unlikely that any method of control now proposed will be sufficiently effective to exterminate halogeton. The hope therefore is to avoid it or temper its effects to such a degree that it is not given a chance to be so deadly as it now appears to be. This hinges around two major points, simple but in all probability highly effective: (1) Wherever possible the plant cover should be improved by better

range management and reseeding until there is little or no space for halogeton and (2) enough forage should be available on the ground so that, in grazing, animals will not get enough halogeton at one time to cause injury. Reports give no indication of cumulative poisoning; eaten in small quantities, the poison is eliminated with other body wastes without being stored in tissues.

It is just possible that the accumulation of accurate knowledge, at present inadequate, may show that halogeton is more difficult to deal with than this article indicates. The chances are, however, that additional knowledge will tend to show how the danger may be escaped or sidestepped. In any event, the panicky feeling now so commonly met with does not help the case and, moreover, seems unwarranted. A word of caution, however, is necessary: It must never be forgotten that halogeton at certain stages (especially in the fall) is highly poisonous, and the best remedy is to prevent animals getting it in lethal amounts. The best way of doing this is to have plenty of good forage available.

Hunt for Better Cows

One of the biggest searches ever organized to seek out new information about dairying is now under way in five Midwest states. The agricultural colleges in those states have joined forces with the Bureau of Dairy Industry to try new and novel ways of developing high-producing dairy animals.

Radically different ways of breeding is the first thing they are tackling. At Illinois, they're cross breeding Holsteins and Guernseys, and comparing them with pure lines. At Wisconsin, they're developing two lines of animals from the same foundation stock of Holsteins—one inbred line, and a normal line. Later they'll cross these two types.

The Minnesota Station is inbreeding Holsteins, and then crossing the inbred lines.

Purdue people are crossing Red Danes with the Red Polled and Milking Shorthorn breeds. They hope to put more milk into the dual-purpose breeds, and at the same time develop a cow that will produce a good red-colored beef steer for marketing.

Dairymen at the Ohio Station are trying to develop superior animals from several breeding systems.

—Farm Journal

New Plants For The New Agriculture

Condensed from Soil Conservation

Dr. Franklin J. Crider
Soil Conservation Service

It is the function of Soil Conservation Service nurseries to provide the highest quality planting materials for soil and water conservation. New and improved varieties of plants are brought into conservation use through a series of evaluation tests known as nursery observational studies.

Designed to meet the specific requirements of the Soil Conservation Service, nursery observational studies entail constant search for species and variants of potential outstanding conservation values and testing them by comparative observation. As an intimate part of field operations, they ferret out and bring to light plant materials which possess the qualities of usefulness desired. Characteristically, the tests begin on the nursery, and end out in the field where the farmer himself participates in the evaluation.

Nursery observational studies are conducted by the nursery division of the Soil Conservation Service through 25 regional nursery centers facilitated by the national observational nursery project at the Agricultural Research Center, Beltsville, Md. The work is closely coordinated with that of the other technical divisions of the Service and handled in collaboration with other Federal and State agencies engaged in related work. The key to its success lies in the fact that the technical facilities and cooperative relationships of the Soil Conservation Service are such as to facilitate the rapid transition of a promising accession or technique from initial trial to farmer-use.

The observational process begins before an accession is planted. Effort is made to bring under observation plants of potential soil and moisture conservation values, combined with other important economic uses, such as forage, farm woodland, and wildlife development.

Native vegetation has offered a ready, virtually untapped source of outstanding conservation plant materials. Nursery techniques, therefore, constantly keep on the lookout for wild species and variants which, because of some out-

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Washington, D. C., April 1951

standing quality such as better ground coverage, greater soil-building capacity, or heavier seed production, are worthy of being brought into the nursery for observation. Another fruitful source of high-quality plant materials is cooperating Federal and State research stations from which strain selections resulting from plant breeding are obtained. Introduced species acquired by exchange also constantly are being incorporated into our trials.

As the first observational step, newly assembled plant materials are grown on the nursery in such manner that the characteristics and performance of the plant as an individual can best be determined. In most cases, especially with grasses and legumes, cultivated rows have proved most satisfactory. Also it has been found that evaluation is facilitated by grouping the various species and strains according to similarity of composition, season of growth, or probable conservation use, with previously accepted standard varieties for comparison. After from one to several growing seasons the accessions are preliminarily evaluated.

Promising selections now are initially increased and subjected to such other on-the-nursery tests as may serve to further substantiate their superiority and applicability to specific conservation jobs. The terrain of a nursery often is representative of a fairly large section and as such composes several land-capability classes. Some of the lands are good and others poor, some level and others rolling and erosive, some irrigated and others that cannot be watered. These varied conditions provide ready means not only for observing climatic and soil influence and vegetative differentiation but make it possible to secure essential information on such problems as site adaptation, stand establishment, and soil building. It is not uncommon, therefore, to see waterways lined with several different grasses to test their erosion resistance, hillsides planted to various ground covers to compare their soil-holding and desilting capacities, plot plantings of grasses and legumes to determine their soil-building qualities and how they get along together, shelter strips of wind-resistant tree types, and wildlife borders of various shrub combinations.

The next stage of the observational procedure is a system of field trials which supplements the on-the-nursery tests. Located in representative farm or conservation problem areas, these trials are designed especially to further determine environmental limitations and erosion-control efficiency along with conservation crop values. The tests are simple and practical and vary in kind and design

according to conservation objective, land-capability class, and the prevailing cropping system. Based upon the results of preliminary evaluations, they include only outstanding selections which appear likely to succeed in the particular farming area.

Further, a species or strain which continues to show distinctive superiority is placed under individual farm field-scale trial. This is accomplished by utilizing representative farms within the respective conservation problem areas. Here the selection is grown by the same methods and in close proximity to similar commonly used varieties.

All individual farm trials are designed to fit into the regular farm plans and work programs of the respective soil conservation districts. Planned by the nursery and other directly interested technicians, they are participated in as well by the district conservationist and work unit conservationist.

Complete evaluation of a new species or variety sometimes is not possible without critical research measurement. This is provided for through cooperative understandings with the State agricultural experiment stations and the appropriate Federal research divisions who usually undertake the solution of a pertinent problem concurrently with our more-advanced stages of observational testing. Thus a newly recommended species or variety represents the combined judgment of all interested State and Federal agencies along with that of the ultimate user, the farmer himself.

Coordinated with plant evaluation as such is the development of improved techniques as relate to the incorporation of a new or re-evaluated conservation plant into farm or ranch operations. Designed to facilitate the application of selected species and strains to soil and moisture conservation practices, this phase of the work covers reproduction and cultural techniques and methods. More often the working out of successful procedures for propagating, growing, and handling a particular plant is as essential as determining its vegetative and adaptive qualities.

Thousands of potentially useful soil-conserving accessions have been processed in this manner. Outstanding in this particular are the good native grasses collected and brought into general farm use —species and strains not heretofore domesticated.

When soil conservationists in this country in the early thirties tackled the big, complex job of restoring vegetative cover to eroding farm and range lands, they were not long in learning the futility of seeding these drastically changed soils to the then-available commercial grass varieties. Thinking next of kinds nature

originally provided—kinds which have survived the extremes of drought, flood, and fire—they turned to Service nurseries for seed supplies of our native grasses. With only one native species, slender wheatgrass (*Agropyron trachycaulum*), having so far found the way into the seed trade, and with little precedent as to how to go about taming these wild forms, this was no simple task. The seeds of some of our finest native grasses, such as the bluestems, are so fluffy, others like the wildryes and needlegrasses so bearded and sharp-pointed, and still others like buffalograss borne so near the ground, they defied harvesting and planting by ordinary methods. To meet this emergency every nursery unit in our major native-grass areas concentrated upon working out the problem.

Enlisting the interest of other public and private agencies, the combined effort resulted finally in the development or adaptation of machines capable of handling satisfactorily even the most difficult seeds. A remarkable advance was finding that by adjustment and some major change the later makes of combines were generally suitable for harvesting purposes, handling with equal efficiency everything from the lowly buffalobur to the 6-foot bluestem plume. Another notable contribution was perfecting the use of the hammer mill for processing seeds. Removal in this manner of the feathery appendages and long awns, followed by recleaning, not only made sowing possible with regular farm equipment, but for the first time rendered such unruly seeds in condition to be handled by the trade.

Mastering the difficulties of harvesting and planting, however, was not the final answer to the domestication of our wild grasses. It took no expert to detect that seed from a particular site produced better grass than that from some other set of conditions. Nursery technicians, therefore, made use of the opportunity afforded by large-scale seed collection to note distinctive plant differentiations. Hundreds of these variants were collected. Placed under close observation in the nurseries, the naturally fixed, soil - conserving characteristics such as greater vegetative growth, large root systems, and better seed production, as expressed in individual or group plantings, became even more pronounced.

Continuing the evaluation process as previously described, superior geographic strain types of a number of our more important native grasses were isolated, named, and brought into conservation use. They are typified by such outstanding varieties as Sherman big bluegrass (*Poa ampla*), Bromar mountain brome (*Bromus*

marginatus), Whitmar beardless wheatgrass (*Agropyron inerme*), Clatsop red fescue (*Festuca rubra*), Primar slender wheatgrass (*Agropyron trachycaulum*), Cucamonga brome (*Bromus carinatus*), Elreno and Vaughn side-oats gramas (*Bouteloua curtipendula*), Blackwell switchgrass (*Panicum virgatum*), and Mandan wild-rye (*Elymus canadensis*).

Examination of native stands revealed further that erosion combined with severe grazing had taken its toll to the extent that some of our more palatable grasses were no longer available in collectible quantities. Notable examples were sand lovegrass (*Eragrostis trichodes*) in the central Great Plains, spike muhly (*Muhlenbergia wrighti*) in the Southwest, and purple needlegrass (*Stipa pulchra*) in California. From persistent remnant stands most of these old favorites likewise have been brought into the nurseries and increased to the point of availability.

Attributable directly to these studies, for the first time in the history of American agriculture the farmer now is able to turn to seed catalogs and, in addition to the varieties referred to above, find listed such valuable native grasses as big bluestem, little bluestem, sand bluestem, blue grama, slender grama, green stipagrass, buffalograss, western wheatgrass, beardless wheatgrass, bluebunch wheatgrass, yellow Indiangrass, Indian ricegrass, alkali sacaton, Texas wintergrass, and sand dropseed.

The remarkable success in domesticating native grasses prompted more recent effort to find untamed legumes for conservation use in our low-rainfall areas, a long recognized need. Nursery technicians have searched the mountains, foothills, and plains for suitable wild forms. Among those assembled in the nurseries are kinds sufficiently promising for the field-trial stage. American vetch (*Vicia americana*) and purple milkvetch (*Astragalus agrestis*), two deep-rooted, stoloniferous species which occur naturally in grasslands, illustrate the type of materials under observation.

The number and relative value of high-quality grasses and legumes of foreign origin brought into conservation use compare favorably with the native grasses domesticated. Some were obtained by seed exchange with technicians of foreign countries, others garnered as distinctive specimens from old fields and out-of-the-way places, and still others represent more common species whose conservation values had not been fully recognized and developed.

In some sections erosion induced by overgrazing or up-and-down-hill farming has so changed the soil and associated environ-

ment that even the native climax vegetation cannot, under prevailing conditions, be replaced. Such was the case on denuded range lands of the Southwest where repeated efforts to restore the original perennial grass cover met with failure. Through observational tests initiated on the nursery and completed on the problem area two good grasses from the dry veld of South Africa, Lehmann lovegrass (*Eragrostis lehmanniana*) and Boer lovegrass (*E. chloromelas*), finally were found that had the initial vigor and staying power to take over.

Finding a good grass for use in reclaiming the rocky, untillable Cedar Brake area of Texas posed a problem that was similarly solved. Here, following chopping down of the usurping juniper in a country so rough that the seed had to be scattered from horseback, King Ranch bluestem, a strain of *Andropogon ischaemum* from Asia, has taken hold and is continuing to spread by self-seeding. Deep-rooted and aggressive, it subdues weedy species and produces heavy ground cover and forage under the most adverse conditions.

Observational trials likewise have revealed that tall wheatgrass (*Agropyron elongatum*), also an immigrant from Asia, is especially suited to wet, alkaline soils. As such, it is filling an important place in providing productive cover for salty lands in the Midwest. Further, these studies have brought to light three other Asiatic grasses, Manchar smooth brome (*Bromus inermis*), and strains of intermediate wheatgrass (*Agropyron intermedium*) and sheep fescue (*Festuca ovina*), well suited to the critical erosion problem area of the Palouse in the Northwest. Falling in the same category is Hardinggrass (*Phalaris tuberosus* var. *stenoptera*) from the Mediterranean region which has been found especially adapted to conservation use in the winter rainfall belt of California.

Turning less specifically to the East, where few good native grasses and legumes exist, we must look almost entirely to foreign sources for close-growing, soil-conserving species. Through observational test in this section, several heretofore overlooked exotic grasses and legumes have been brought into conservation use, including Pensacola and Wilmington Bahiagrasses (*Paspalum notatum*) and blanket indigo (*Indigofera pilosa*). In addition, reevaluation of the more common species for soil conservation has greatly extended the use of valuable varieties such as Kentucky 31 fescue, coastal Bermuda-grass, rescuegrass, Ladino clover, Caley-pea, blue lupine, hairy indigo, and self-seeding crimson clover together with sericea, annual, and bicolor lespedezas, and kudzu

found especially suitable for protecting and rebuilding worn-out soils in the South.

Other introduced grasses of major importance brought into conservation use include weeping lovegrass, Wilman lovegrass, Fischer and Elsberry smooth bromes, Russian wildrye, pubescent wheatgrass, and blue panicum, none of which were available to farmers prior to initiation of these studies.

Likewise brought into conservation use for the first time are many specifically adapted woody species, exemplified by: stoloniferous, dense-growing coyote willow (*Salix exigua*) for stabilizing stream and pond banks; drought-enduring Africa wild olive (*Olea verrucosa*) and bladdersenna (*Colutea arborescens*) for dry-situation windbreaks; vigorous, straight-trunked black locust (*Robinia pseudoacacia*) for farm fence posts; big-berried American holly (*Ilex opaca*), tart-fruited mulberry (*Morus alba*), and disease-resistant Japanese raspberry (*Rubus parvifolius*) as supplemental cash crops on steep hillsides; dual purpose multiflora rose (*Rosa multiflora*) for living fence and wildlife cover; and cold-hardy, early-maturing bicolor lespedeza (*Lespedeza bicolor* var. Natob) that extends much farther north the range of this important game-food species.

Operating over a period of 15 years, nursery observational studies are making profound contributions to our national soil and water conservation program and agriculture generally. In contrast to earlier effort before the results of these studies became effective, Soil Conservation Service nurseries now are able to grow the highest quality, specifically applicable planting materials. Supplementing on-the-nursery production, seed stock is made available to soil conservation districts for further increase and use. In many cases the seed from the nurseries is foundation seed stock from which the grower produces certified seed. Constantly mutiplied and applied to the land, these superior varieties mean more soil held in place and improved, more and better pastures, higher crop yields, and greater farm income.

Herd Sire Fertility

Condensed from the Ayrshire Digest

Dr. George W. Trimberger
Cornell University

HIGH FERTILITY is essential for economic production, and from the standpoint of successful breeding it is needed to perpetuate the good ones. The importance of the sire for maintaining high breeding efficiency among females in a dairy herd cannot be over-emphasized though responsibility for a good conception rate rests with both. In order to have bulls of maximum usefulness, the breeder needs to give attention to all phases that may influence the fertility level of the bulls which are used within the herd.

Because the sire has such an influence on herd fertility, it pays to raise a young bull so he produces high quality semen at an early age and to keep him in this condition for as many years as possible. A bull wth high fertility is valuable in many ways. If the females are of low fertility, then it is much more important to have a sire of exceptional fertility. When a bull of exceptional fertility is available, many females of apparently low fertility will conceive. This approach is so successful that more breeders should consider the use of it in herds with a low conception rate, when there is no evidence of a contagious infection among the females.

The ideal mating is one in which both the bull and the females are of high fertility. The next best is when bulls of exceptional fertility are used with females of low fertility or the reverse. When both the bull and the females are of low fertility, obviously very poor results will be obtained. Therefore as the fertility of one of these goes down, the fertility of the other becomes of greater importance.

Half of the time, the herd sire is responsible for low rates of conception. Since the low fertility of a bull multiplies itself when he is used on many cows, it usually is advisable to sell for slaughter the sires of low fertility unless they are of exceptional value.

With a bull of exceptionally high fertility, breeding problems in a herd often disappear entirely or are at least greatly reduced. When there is trouble with the females, it is necessary to put more and more emphasis on the fertility

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level of the herd bull. Almost any herd has a few females that prove troublesome. Many breeders with large herds keep one bull of exceptional fertility to use on difficult cows. The use of such a bull often is justified even if he doesn't possess as good a pedigree as other bulls in the herd. Often such a bull serves a good purpose in protecting the valuable bull in a herd from being exposed to females that are questionable on reproductive infections.

One occasionally hears a breeder say that the bulls in artificial breeding are not of high enough fertility to get his cows with calf. It would be more accurate for him to say his cows are not of high enough fertility for artificial breeding. With the large number of bulls in an artificial breeding unit, they cannot all be of exceptional fertility. However, most bulls are of average or better fertility because the conception rate for each is carefully tabulated and bulls with less than an average rate are constantly eliminated.

Interest in a high breeding efficiency has reached a peak in the last few years. The best and only sure test of a sire's fertility is his breeding record with the cows to which he is mated. However, since a good semen picture does not necessarily insure high fertility, but poor semen quality almost invariably indicates a low conception rate, there are many supplementary tests that a veterinarian or technician can make. Their evaluation and diagnosis often reveals the cause for low fertility. Usually the following observations are made:

1. motility of sperm cells
2. normal concentration or sufficient numbers of cells
3. high percentage of normal cells
4. storage capacity.

In addition, the bull should be examined to see that he is normal and free from injuries. For optimum breeding results, the semen and the bull's reproductive tract should not harbor harmful bacteria, trichomoniasis, contagious vaginitis, vibrio feuts, Bang's or other infections. Usually these specific diseases prove troublesome and require the help of a well qualified veterinarian.

A history of breeding trouble which follows a definite, recognizable pattern of a low conception rate combined with a considerable number of returns after apparent conception should make the breeder suspicious of one of the infections mentioned above. Even more important than finding which one of these diseases is at fault, is to protect the good bull so he does not become infected and ruin his high fertility.

Two avenues are used by which to protect a bull from acquiring the infection that exists in a herd. Usually these diseases are spread

through the bulls at the time of service. The bull becomes infected by serving infected females and is a spreader thereafter. But the fortunate thing is that ordinarily, a female will be free from these diseases after a normal full-term calving even though previously exposed to an infected bull. Bulls on the other hand are difficult to treat successfully and the veterinarian may or may not find it possible to free him of the disease. Therefore, whenever any of these infectious diseases are suspected in a herd, a practical procedure is to get a clean bull; then use him either entirely by artificial breeding or use him only on virgin heifers and on cows that are bred for the first time following a normal calving.

Cows previously bred to the bull that apparently carried the infection should be bred to him until they conceive. If such a bull has too poor a breeding record, then another bull that is on his way to the stockyard can be used to breed the exposed females. As a rule, it is recommended that females previously exposed to an infected bull be given three free heat periods without service; then they are switched to the bull used only on the females suspected of infection because they were served by an infected bull. Once a cow conceives and calves normally, she can be bred to the clean bull.

This practical procedure has been used extensively with good results. Breeders should consider using it when they see evidence that females are becoming infected following service to a particular herd sire. If the herd is not large enough to justify keeping several bulls for a time, then artificial breeding can be resorted to for the cows which have been previously bred to the infected bull until they conceive, and go through a normal calving. This approach is recommended especially if a valuable sire is brought into a herd in which the previous history has indicated some trouble.

If at any time a reproductive infection is suspected to be present in the herd, females should not be switched or rotated from one bull to another for natural breeding. Otherwise this practice provides ideal conditions to spread the infection from one bull to another through the female.

Before a proven sire is introduced into a disease free herd that has a satisfactory reproductive performance, his previous breeding record should be carefully observed and the results studied for the herd in which he was used.

Although a cow is a member of an apparently clean herd with little indication of trouble it always is advisable to breed females which conceived and then return several months later or females with an infection at calving time by using artificial insemina-

tion. This will tend to protect the bull from exposure. If the opportunity to breed artificially is not available then the next choice is to allow these cows to be served by a second and less valuable bull in the herd.

Recent research has provided help for bulls of low fertility caused by the presence of an infection in the reproductive tract. The use of antibiotics or germ killers with artificial insemination is now in general practice. At first, sulfanilamide was added to the semen to act as an antibiotic. Additional research pointed out the superiority of streptomycin and penicillin. Today these three antibiotics are used together because each one attacks a different group of harmful organisms, making them much more effective when used in combination.

The use of antibiotics in the semen will often increase the rate of conception by 5 percent for bulls of relatively high fertility. It may increase it as much as 25 or 30 percent when added to the semen sample from bulls of low fertility.

Obviously, since low fertility can be due to many causes, not all bulls with low fertility will benefit from the use of antibiotics. However, information now available indicates that about half of the bulls in this category will give a very favorable response from the use of antibiotics.

Normal semen from a bull with high fertility will usually contain about 800 million to a billion or more sperm cells per cubic centimeter. A bull generally ejaculates from 5 to 10 cubic centimeters of semen at a time. This is one or two teaspoonsful—but in it are a total of 5–10 billion or more sperm cells.

Approximately 70 or 80 percent of these cells should have active motility when observed under the microscope and at least 70 percent of the sperm cells should be normal in size and structure. It is also necessary for semen to store well when properly diluted, cooled, and kept at a constant temperature of about 40° F.

Since the artificial vagina has come into use, it has been possible to check accurately on bulls with poor breeding records and observe many cases of abnormal semen production.

Low motility can be corrected by hormone therapy or treatment by a veterinarian. The treatment with 30 c.c. (1500 units) of Gonadin gives a remarkable demonstration of how dependent the reproductive functions are on the hormones or glandular secretions of the body. This treatment seldom fails to bring about a response. It is almost amazing to take semen samples from a bull over a period of time and consistently observe the low motility; then ten days after the Gonadin

hormone is injected into the gluteal muscle (located between the hips and pin bones in the pelvis region) marked improvement invariably is seen in a sample from the same bull. Usually the motility will be about normal.

In about half of the cases treated, a permanent response is obtained. The other half will remain up for several weeks or longer and then drop again. Such bulls will respond for a period of several years to treatments and finally give less and less response. The offspring from such bulls will usually be grouped to coincide with the periods of treatment.

For semen lacking in concentration, semen with too many abnormal sperm cells and semen which stores poorly, no satisfactory treatments are available which give consistent and reliable responses. However, it is often worth while to try abundant pasture, sunshine, exercise, and a good source of high quality animal protein such as blood meal, dried non-fat milk solids or others. During the winter months a high quality roughage or grass silage may be helpful. Occasionally under certain conditions of poor roughage feeding it may be advisable to feed vitamin A for several months at the rate of 100,000 to 250,000 units per day depending upon the size of the bull.

Many breeders have had the aggravating experience of spending an hour or more with a bull before he serves the cow. Some times interest is so low, especially in older bulls, that they will not even mount the cow. Others will mount but will not serve. It is not advisable to leave a cow with a bull if he is a slow server because there is no way to know whether or not the cow actually was served.

Bulls may lack sexual drive or be poor at serving for a number of reasons. Young bulls may be underfed, resulting in slow sexual maturity. Older bulls may have sore feet which need trimming or they may have an injury; some are too fat or too thin, or have developed too much barrel from eating large quantities of roughage; still others may lack the proper hormone secretions in their body system.

Often these situations can be remedied by correcting the management procedure. If the feet are sore, they should be trimmed and treated. Regular and sufficient exercise should always be provided. A mechanical exerciser may be the answer. Many bulls will lose their drive if kept tied in a stall without exercise. However, others will maintain good breeding form and high fertility while they stand in a stall all season. A breeding chute may be beneficial for large bulls.

Bulls with too large a barrel can be put on a feeding schedule to change this aspect of conforma-

tion. From methods used at Cornell, it appears desirable to bed the bulls with shavings so they will not eat the bedding. The hay provided should be of exceptionally high quality so only a limited amount has to be consumed to furnish the required nutrients. Never should the bull be given coarse or stemmy hay refused by the milking cows. In some cases, it helps to replace part of the hay with grain; this furnishes the required nutrients in less bulk. Sometimes it is an advantage to feed 25–30 pounds of silage daily to slow breeding bulls since it is a succulent feed. However, it probably is advisable not to feed large quantities although a few dairymen get away with it.

It is possible to use either hormone therapy or a specific drug. The hormone treatment consists of having the veterinarian inject a gonadotrophic hormone (Gonadin). The drug which the veterinarian can prescribe for this condition is a daily dose of 5 grams of chlorobutanol, also called chloretone or trichlorobutyl alcohol. This can be given in capsule form for an indefinite period. However, 10 grams of the powder will soon cause him to stagger since it has an anesthetic effect. Giving this in capsule form is much more satisfactory as it eliminates any possibility of the bull not taking his daily allowance.

Parity

Condensed from Agricultural Situation

J. Franklin Thackrey
Bureau of Agricultural Economics

PARITY has been back in the headlines since the General Ceiling Price Regulation was announced in late January. Under the law, ceilings cannot be set on any farm product at a level that will prevent farmers from getting at least the parity price.

Parity first gained national prominence back in 1933 when the parity formula was written into the first Agricultural Adjustment Act. According to the statement in this law, farmers' prices are at parity whenever they have the same "purchasing power with respect to articles farmers buy" that they had in the base period.

The basic idea behind parity is economic justice. It's a belief that prices farmers receive for their products should be high enough to give them a fair return. However, the actual calculation of "parity prices," "parity ratios," "parity indexes," and so on is

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complicated. This article does not attempt to explain the detailed operations in computing parity prices. Rather, it is intended to answer some of the questions about which there seems to be the most confusion.

Here are the questions and answers:

How are parity prices determined?

At present, two formulas are being used to determine parity. One is the "old" formula, adopted in 1933, and revised a little since then. The other is the "new" formula in the Agricultural Act of 1949. It went into effect at the beginning of 1950.

The use of two formulas is one source of confusion. We now have "old" parity prices, "new" parity prices, and "transitional" parity prices. The parity prices actually used are called "effective" parity prices.

Why are both formulas being used to figure parity prices?

The Agricultural Act of 1949 re-defined parity in order to correct certain objectionable features in the old formula. The new definition substantially lowers parity on some commodities while raising it on others. Congress decided that farmers producing crops whose parity prices would be sharply reduced under the "new" formula should have time to make any necessary adjustments. When the act was passed, prices had fallen and seemed likely to drop further.

How are "effective" parity prices determined?

Under the law, the parity price for basic commodities (cotton, wheat, corn, rice, peanuts, and tobacco) must be figured out each month under the "old" and the "new" formulas. The higher becomes the "effective" parity.

For nonbasic (all other) commodities, the same thing is done except that five per cent for each full calendar year since January 1, 1949, is taken away from the parity price figured under the old formula to get a "transitional" parity. The "transitional" parity is then compared with the "new" parity price to see which is higher; the higher becomes the "effective" parity. Any time the transitional parity drops below the new parity, the new parity is used from then on.

Since 1951 is the second full calendar year since January 1, 1949, the transitional parity this year is the old parity price minus 10 per cent. Next year it will be the old parity price minus 15 per cent.

How long will both formulas continue to be used?

As the law now stands, "effective" parity prices for basic commodities will be figured as they are at present until the end of 1953. After that time, the "new" parity will be the effective parity for all commodities, if it is higher

than transitional parity. In 1954, transitional parity will be 75 per cent of the old parity. In the meantime, transitional parity prices for those nonbasic commodities concerned will be used until they drop below parity prices under the new formula.

The old parity is now the effective one for wheat, corn, cotton and peanuts. Transitional parity prices are being used for 35 commodities. For other commodities, the new parity price is the effective parity.

How is the new parity formula different from the old?

The main differences are: (1) The new definition takes farm wage rates into account in figuring parity, and (2) a moving "modernized" base period is used for individual commodities in place of the fixed base period used in the old definition. There were other, comparatively minor, changes.

What was the reason for taking wage rates into account in calculating parity?

Congress added farm wage rates to the calculation of parity because they are one of the farm operator's important items of expense. Wage rates have risen more than prices of most other goods and services bought by farmers. The addition of wage rates makes the general average of parity prices for farm products a little higher under the new formula than under the old.

What is the purpose of the moving base period?

The moving base period prices were adopted to bring the relationships among parity prices for individual farm products more nearly up to date. For example, per capita consumption of livestock products has increased over the last three or four decades, while per capita consumption of grains and potatoes has declined. The cost per unit of producing grains and potatoes has been reduced in relation to the cost of producing livestock. Therefore a continuation of the old parity relationships in present and future price programs would tend to result in comparative surpluses of some products and comparative shortages of others. The moving base period is designed to help balance current production with present day demand, as between the different commodities.

How does the moving base period affect parity prices of individual farm products?

The effect varies by commodities. If prices received by farmers for a product since the base period have gone up more than the average for all farm products, the parity price under the new formula will be higher than the old. If prices for a commodity have risen less than average, the new parity price will be lower.

How does use of the moving base period affect the general

level of parity?

The increase in parity prices for some products resulting from use of the moving base period balances the decrease for others. It does not in itself have any effect on the average level of parity for all farm products.

However, temporary use of "old" parity and "transitional" parity for some commodities results in a slightly higher general level of parity prices than would be the case if "new" parity prices were being used exclusively.

Which formula is used in determining the general level of parity?

Only the new formula is used by the Bureau of Agricultural Economics in reporting the average per cent of parity received by all farmers for all products taken together.

Why do parity prices change?

Parity prices change because of changes in prices and rates paid by farmers (the parity index). If the index goes up, parity prices go up proportionately. If the index goes down, parity prices also go down. This is true whether parity prices are figured under the old or the new formula.

However, the "new" parity prices and "transitional" parity prices may change each January regardless of whether the parity index changes or not. That's because the new parity formula changes the base period for individual commodities in January each year.

Temporarily, parity prices also may change each January because at that time the "transitional" parity price is reduced another 5 per cent below what the parity price would have been under the old definition. That's the main reason that parity prices for some commodities went down in January 1951 even though parity prices for most commodities went up because of the increase in prices and rates paid by farmers.

A Valuable Fertilizer

The value of manure produced on a farm often comes to a high figure.

A. R. Wolcott, Michigan State College, says that a six-month accumulation of manure on a farm carrying twelve milk cows and the corresponding young stock is equal to 5½ tons of 10-5-10 fertilizer, worth approximately $300 at present prices. During spring months when field work is heavy, it's easy to neglect manure spreading. Getting manure onto the fields will mean dollars saved and higher crop yields.

—Short-horn World

Deferred Feeding and Dairy Replacements

Condensed from Kansas Farmer

Ed Rupp

Livestock has taken on new importance in Labette county, Kansas. More farmers are beginning to count beef cattle as a major source of income, in place of a side line to grain production. And right along with that movement is an important new dairy heifer replacement program.

Both cattle programs were introduced to Labette county last year when County Agent Russell Klotz brought 1,000 head of whiteface calves into the county to be handled on the deferred program. In the same year he brought more than 200 head of dairy cattle into Labette county to bolster the dairy industry.

These cattle were distributed to a large number of farmers. There are only a few cases where an individual took more than 50 head of deferred calves. But it looks now as if the man who took 15 head last fall will want 25 or more this fall. The man who took 50 head may want 150 in another year. That's the way things are going. Much of the increase depends to a large extent on how rapidly pastures can be improved to accommodate larger cattle programs. That is the foundation for success in cattle.

Paul Sramek, Oswego, took 50 head of Hereford heifers last fall that weighed 346 pounds on an average when purchased down in Texas. These heifers were wintered on corn silage, a little prairie hay and 1 pound of soybean meal and 1 pound of corn chop a day for each head. Have they grown? Mr. Sramek's heifer calves had plenty of room around the 3 long feeding bunks last fall. This spring they were a little crowded when then all moved up to the trough.

Price of cattle was high last fall. But these heifers have put on a lot of growth on economical feed. They will put on more cheap gains this spring and summer on brome-alfalfa and brome-red clover pasture. And after their quick-growing winter rations, they will be in perfect condition for good pasture gains.

After a short grain feed Mr. Sramek will be able to sell those 50 heifers at a 25 per cent lower figure than their purchase price and still make a good return on home-grown feed he gave them.

But let Bob Miller, Labette, tell

Reprinted by permission from Kansas Farmer,
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you what he thinks about the deferred-feeding program. He is a young farmer who fed cattle when a boy. He has fed cattle since farming for himself, too. But his luck with deferred feeding has convinced him of some things he said he would not have believed before this year.

Mr. Miller contracted for 20 head of young steer calves. They cost 32 cents a pound last fall. They had good picking in old soybean fields, corn and milo fields where some grain had been lost. They were getting lespedeza hay while running on those fields. About the first of February he started giving them alfalfa hay. He tried to bring their grain ration up to 4 pounds a day during winter, but they just wouldn't eat it while running out on those fields.

But before pasture time in spring he had them up to 4 pounds and was trying to get them up to 6 pounds to catch up with a 4-pound average he had intended to feed them.

After running on grass in spring and early summer, Mr. Miller plans to follow right along with the deferred program. He will take them out of the pasture in midsummer and dry-lot the steers for about 100 days to give them a final finish.

The other day Mr. Miller sat down and tried to figure out just where he stood with his deferred steer calves. He believes he could sell them for 18 cents a pound this fall and still break even. That is the figure Mr. Miller says he would not have believed himself before this year.

He plans to enlarge his deferred-feeding program. To support the cattle he intends to seed 20 acres of brome grass and alfalfa this fall. In addition to that he hopes to plow under 35 acres of native grass this summer. This acreage will go to small grain and sweet clover first, then to brome and alfalfa in fall of 1952.

Mr. Sramek plans to enlarge his deferred feeding program, too. Fifty head of heifers last fall was a good start for him. But his plans call for most of his acreage to go to brome grass and alfalfa. He has his sights set on 150 head of deferred calves each year as soon as his pasture program can handle that many.

Most of the 200 head of dairy calves brought down from Wisconsin went to dairy farmers. But a few went to farmers that have no intention of milking them when they grow up. They are being produced strictly for a new dairy heifer replacement program.

The Eichhorn Brothers are trying the dairy heifer replacement project for the first time. They took 10 head of Holstein heifers with good milk production in their backgrounds. The average cost was $150 a head last August.

That was the cost laid down on the Eichhorn farm. These heifers were bred artificially last November and will be ready for production this fall when milk prices should be highest.

Besides breeding costs, Eichhorn Brothers have a winter's supply of silage and hay in these heifers. And they will provide them with a summer's supply of top-quality pasture. How much will they bring? Well, Fred Eichhorn said he had been offered $350 a head for fall delivery.

Agent Klotz has something new in mind with dairy heifer replacements. If all goes well there may be a bred dairy heifer sale in Labette county in another year.

Not only that but 500 head of Western ewes were imported into Labette county in 1949 before Klotz became the county agent. Last year another 500 were brought in and another 1,000 or more may be brought in this year.

Livestock is on the increase in Labette county.

Makes Hogs Out Of Runts

Condensed from The American Hampshire Herdsman

EVERY year some 40 million runty and slow-growing pigs cost farmers millions of dollars in wasted feed and uneconomical gains. Now, new research findings prove that about 80 percent of these runts can be saved. They can be converted into marketable hogs at a profit, and at the same time, help add more than a billion pounds of pork to the Nation's market basket.

How can this be done? It's a matter of feeding. Dr. W. N. McMillen, formerly with Michigan State College of Agriculture and now associated with a leading feed manufacturer, has hit upon a feeding formula that may become one of the most important nutritional discoveries in the history of hog raising. It has been tested and retested on many research feeding trials and experiments.

What happened made even conservative research men blink their eyes. The new feed actually turned runts into thrifty pigs in 30 days or less. As a final conclusive research test, a group of runty pigs, averaging 26 pounds per pig was divided into two lots for a 30 day test. One lot was fed the new runt feed and the other was fed a standard, well-balanced

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pig ration.

The runts fed the new runt feed gained an astounding 28.2 pounds per pig for the 30 day period—a .94 pound daily gain at the rate of only 2.07 pounds of feed for each pound of gain. The runts fed a standard pig ration gained only 5.7 pounds per pig during the test period, for an average daily gain of only .19 pounds, and used up 4.40 pounds of feed for every pound of gain.

Could such spectacular research results be duplicated under average hog raising conditions on the farm? Dr. McMillen, ready to stake his reputation on the outcome, said that it could be done. Right now, this new feed is under test with thousands of runty, slow-growing pigs on farms in five corn belt states. And results indicate that the average "poor-doing" farm pig likes this new feed equally as well, and thrives as well on it as the research pigs did.

Not all returns are in, at this writing, but records on 672 runty pigs from 28 farms fed an average of 22 days gained an average of 26.7 pounds—a daily gain of 1.20 pounds. It took only 2.19 pounds of feed to make a pound of gain.

In answer to the "whys" and "wherefores" of this almost magical new pig feed, Dr. McMillen has a disarmingly simple explanation. He says that it's a matter of combining appetite appeal with high fortification of the right ingredients. But here's the catch. Almost anyone can duplicate the same list of ingredients. The trick lies in getting a proper and intricate "ingredient balance."

In order to start runts making hogs of themselves, just enough "tastiness" must be included in the formula to get them to increase their feed intake. Then h i g h fortification of power-packed ingredients must be present to make these runts put on pounds as fast as possible. To be more specific, this high fortification includes B-12 and antibiotic feed supplements, plus additional high potency ingredients.

This all points up the fact that stupendous strides have been taken recently in pig nutrition. Such progress in feeding will go a long way in reducing the tremendous economic losses from runty, unthrifty pigs for American farmers.

Alfalfa Yields New Wonder Drug

A new wonder drug is chlorophyll. Physicians and chemists are finding it will do a lot of almost unbelievable things. It heals wounds that will not respond to usual methods of treatment. It is especially effective for burns. Some believe it is the substance to which the medical profession would turn in event of atomic warfare.

In one big military hospital during the war it was found that chlorophyll had another very desirable quality—it neutralizes the odor of wounds as well as healing them. Other research has shown it removes the odors of bad breath and perspiration.

Already it is being used in toothpaste, in healing ointment, and in tablets to be taken internally to combat bad breath and body odors.

Most of the country's chemical and pharmaceutical laboratories are teeming with ideas for new uses. The cigaret manufacturers are testing it to combat throat irritation and tobacco breath. Dog food manufacturers want to put it into their product to tame Towser's halitosis. There's a long string of others who see a use for it in their business.

Doctors and veterinarians need more, both for treatment and for research.

Chlorophyll is the green substance in leaves that takes water from the soil and carbon-dioxide from the air and combines them into starches and sugars, on which, directly or indirectly, all animal life depends for food. Compared to immediate needs, the material is abundant. Yet the current price is $90 a pound. At that figure, a ton of good, leafy alfalfa contains $900 worth! The high price comes from the great demand, and methods of extraction that have been getting as little as 10 per cent of that contained in the dehydrated alfalfa from which it has been made.

Now a way has been found to make it from fresh green alfalfa. In mid-September half a dozen big chemical and pharmaceutical companies, and the W. J. Small company, the country's largest dehydrator of alfalfa, joined to form a corporation to produce it by the new method. This process removes chlorophyll and carotene, together with a small mineral fraction. The wet substance is sprayed on a drum for quick drying. This part will be performed by the Small Company. The manufacturing chemists will separate chlorophyll from the other substances, and use the carotene for making provitamin A products.

—Capper's Farmer

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